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ABSTRACT

This user's manual summarizes the results and use of design effects and generalized variance functions (GVF) to approximate standard errors for the 1990-91 Schools and Staffing Survey (SASS). It is Volume I of a two-volume publication that is part of the Technical Report series of the National Center for Education Statistics (NCES). The SASS is a periodic integrated system of sample surveys conducted by the NCES that provides information on public and private schools, public school districts, teachers, and administrators. The survey includes several types of teacher and administrator respondents. The 1991 SASS is a set of four related surveys dealing with teacher supply and demand, school administrator characteristics, information about schools and students, and teacher characteristics. This manual introduces the design effect and the GVF for estimating sampling variances for complex surveys such as the SASS. Appendixes contain: (1) variables selected for average design effects and GVF fitting; (2) average design effects tables; (3) GVF tables; and (4) a sum of weights table. (Contains 8 tables, 9 tables in the appendixes, and 33 references.) (SLD)

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ED 397 095

NATIONAL CENTER FOR EDUCATION STATISTICS

Design Effects and Generalized Variance Functions for the 1990–91 Schools and Staffing Survey (SASS)

Volume I

User's Manual

U.S. DEPARTMENT OF EDUCATION
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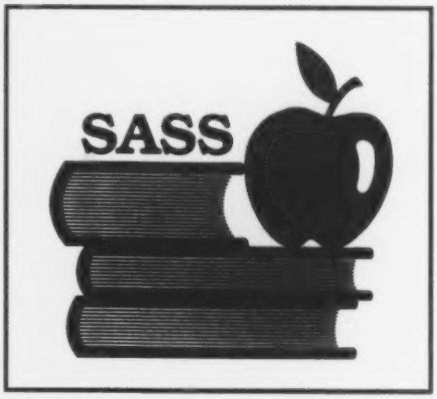

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Design Effects and Generalized Variance Functions for the 1990–91 Schools and Staffing Survey (SASS)

Volume I

User's Manual

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PREFACE

This user's manual summarizes the results and use of design effects and generalized variance functions to approximate standard errors for the 1990-91 Schools and Staffing Survey (SASS). It is Volume I of a two-volume publication that is part of the Technical Report Series published by the National Center for Education Statistics (NCES). Volume II is intended as a technical report describing the concept, methodology, and calculation/modeling of design effects and generalized variance functions (Salvucci et al. 1995). Users who are interested in knowing more about the background and methodological issues are referred to Volume II, the technical report. The methodological descriptions in Volume II, though not necessary for using this manual, would be very helpful for users to reach a better understanding of the methods and hence their use as illustrated by this manual.

1. Overview

The Schools and Staffing Survey (SASS) is a periodic, integrated system of sample surveys conducted by the National Center for Education Statistics (NCES) of the U.S. Department of Education. The complex sample design of SASS produces sampling variances different from those produced by *simple random sampling* (srs) with fixed sample size. This is so for a number of reasons. There are gains in precision from stratification by geography, type of school, size of school, and so on. These gains, however, are counterbalanced by the effects of clustering of students and teachers within sampled schools. Weighting can be conducted to determine the contribution of sample units to the population estimates. However, the weights themselves are subject to sampling variability which may make nonlinear the statistics which are linear with simple random sampling. The calculation of variance estimates for SASS statistics are, therefore, more complex than the simple random sample variance estimation algorithms and computationally more expensive. Using the simple random sample methods for SASS complex samples almost always underestimates the true sampling variances and makes differences in the estimates appear to be significant when they are not. Unfortunately, general use statistical packages such as SAS, SPSS, etc., only calculate sampling variances based on simple random sample and are thus not appropriate for estimating variances for SASS.

This manual introduces two general techniques: the *design effect* and the *generalized variance function* (GVF), for estimating sampling variances for complex surveys such as SASS. These techniques differ from the direct estimation methods which either use point variance estimators or conduct replication procedures to obtain variance estimates individually for survey statistics. These general techniques use generalized analytical approaches, applied to groups of survey estimates, to produce complex sample variance estimates, for a variety of survey statistics, from srs variance estimates or from survey estimates themselves. The Introduction section of Volume II of this publication describes the rationale for developing and employing such general techniques.

The average design effect and GVF tables provided with this manual (appendix II and appendix III) are products of an empirical study as reported in Volume II of this publication. They can be used as alternatives to direct variance estimation for SASS, in particular, when appropriate statistical software is not available to conduct the balanced half-sample replication method (see section 1.3, Volume II) using the replicates provided on each SASS public use file (Kaufman and Huang 1993, Gruber et al. 1994). Generalized variance functions have been shown in some data settings to perform as well or better than direct variance estimators in terms of bias, precision, and confidence interval construction (Valliant 1987). The performance of the GVFs generally depends on the critical issue of selection of a set of survey variables for GVF modeling, the type of GVF model chosen including the method of estimating the parameters of the GVF model. A cautionary note is that there are likely to be survey variables (e.g., estimate of rare characteristics) whose GVF model differs considerably from that of most variables and for which GVFs will give poor results. Section 3.4 provides a list of specific types of variables in SASS for which GVFs may be inappropriate.

NCES has recently issued guidelines on recommended technical approaches for performing analysis on NCES survey data (Ahmed 1993b). The guidelines describe two categories of procedures and their order of preference. First, the preferred procedure is to use a program designed specifically for analyzing data from complex surveys, such as WESVAR/WESREG (Westat 1993), SUDAAN (Shah et al. 1992), and VPLX/CPLX (Fay 1995) to compute standard errors. Second, an alternative but acceptable procedure is to use a standard statistical package such as SAS or SPSS and a design effect correction to the standard error. The method of using generalized variance functions can be considered in the same category of alternative procedures as the design effect correction. When using the alternative procedures, choosing between design effect and GVF depends on the circumstances of the particular data analysis. Therefore, no general recommendation on using one or the other may be made here. These points will be made clearer in section 3.1 after discussion of the examples.

The purpose of this volume is to illustrate clearly the application of the two techniques, using the tables provided in this manual, to approximate variance estimates or standard errors for SASS. Following this overview, we first give a brief description of the SASS data (sections 1.1 and 1.2); then a conceptual introduction of the estimation and use of standard errors with complex survey data (section 1.3 through 1.5); and finally a description of the grouping of statistics regarding the structure of the tables provided with this manual (section 1.6). Sections 2 and 3 provide a brief review and a how-to guide on the use of the design effect tables and generalized variance function tables, respectively. For a more detailed methodological discussion of these techniques, users are referred to Volume II, section 3, Design Effect Methodology, and section 4, GVF Methodology, of this publication.

1.1 Source of Data

The data were collected in the second cycle of the Schools and Staffing Survey (SASS) conducted by the National Center for Education Statistics (NCES) in 1990-91. SASS provides data on public and private schools, public school districts, teachers, and administrators, and is used by educators, researchers, and policy makers. The survey includes several types of respondents: school district personnel, public school principals, private school principals, public school teachers, and private school teachers, among others. The 1990-91 SASS is a set of four interrelated national surveys.

The following elements make up the 1990-91 SASS:

a. The Teacher Demand and Shortage (TDS) Survey targeted public school district personnel who provided information about their district's student enrollment, number of teachers, position vacancies, new hires, teacher salaries and incentives, and hiring and retirement policies.

b. The School Administrator Survey collected background information from principals on their education, experience, and compensation and also asked about their perceptions of the school environment and the importance they placed on various educational goals.

c. The School Survey included information on student characteristics, staffing patterns, student-teacher ratios, types of programs and services offered, length of school day and school year, graduation and college application rates, and teacher turnover rates. The 1990-91 private school questionnaire incorporated questions on aggregate demand for both new and continuing teachers.

d. The Teacher Survey collected information on public and private school teachers' demographic characteristics, education, qualifications, income sources, working conditions, plans for the future, and perceptions of the school environment and the teaching profession.

1.2 Sample Design

The target populations for the 1990-91 SASS surveys included U.S. elementary and secondary public and private schools with students in any of grades 1-12, principals and classroom teachers in those schools, and local education agencies (LEAs) that employed elementary and/or secondary level teachers. In the private sector, since there is no counterpart to the LEAs, information on teacher demand and shortages was collected directly from individual schools. The sample was designed to produce 1) national estimates for public and private schools, 2) state estimates for public schools, 3) state/elementary, state/secondary, and national combined public school estimates, and 4) detailed association estimates and grade level estimates for private schools.

These are the three primary steps in the sample selection process followed during the 1990-91 SASS:

(1). A sample of schools was selected. The same sample was used for the School Administrator Survey. For the sample of private schools, the questions for the Teacher Demand and Shortage Survey were included in the questionnaire for the School Survey.

(2) Each LEA that administered one or more of the sample schools in the public sector became part of the sample for the Teacher Demand and Shortage Survey.

(3) For each sample school, a list of teachers was obtained from which a sample was selected for inclusion in the Teacher Survey.

Details pertaining to the frame, stratification, sorting, and sample selection for each of the four surveys of SASS are described in the sections below (Kaufman and Huang 1993).

1.2.1 School Survey

The School Survey had two components: private schools and public schools. The primary frame for the public school sample was the 1988-89 Common Core of Data (CCD) file. The CCD survey includes an annual census of public schools, obtained from the states, with information on school characteristics and size. A supplemental frame was obtained from the Bureau of Indian Affairs, containing a list of tribal schools and schools operated by that agency. The school sample was stratified, with the allocation of sample schools among the strata designed to provide estimates for several analytical domains. Within each stratum, the schools in the frame were further sorted on several geographic and other characteristics. A specified number of schools were selected from each stratum with probability proportionate to the square root of the number of teachers as reported on the CCD file. The target sample size of public schools was 9,687.

A dual frame approach was used to select the samples of private schools. A list frame was the primary private school frame, and an area frame was used to find schools missing from the list frame, thereby compensating for the coverage problems of the list frame. To supplement the list frame, an area sample consisting of 123 primary sampling units (PSUs) was selected. The target sample size of private schools was 3,270, with 2,670 allocated to the list sample and 600 to the area sample. The list sample was allocated to 216 strata defined by association group, school level (elementary, secondary, combined), and census region (northeast, midwest, south, west). There were 18 association groups; for example, Catholic, National Society of Hebrew Day Schools, and National Association of Independent Schools. Within each stratum, schools were sorted by state and other variables within state. The area sample was allocated to strata defined by 123 PSUs and school level (elementary, secondary, combined). Within each stratum, schools were sorted by affiliation (Catholic, other religious, and nonsectarian), 1989 PSS enrollment, and school name. For both the list sample and the area sample, schools were systematically selected from each stratum with probability proportionate to the square root of the number of teachers as reported in the 1989-90 PSS. Any school with a measure of size larger than the sampling interval was excluded from the probability sampling operation and included in the sample with certainty.

1.2.2 School Administrator Survey

For the School Administrator Survey the target population consisted of the administrators of all public and private schools eligible for inclusion in the School Survey. Once the sample of schools was selected, no additional sampling was needed to select the sample of school administrators. Thus, the target sample size was the same as for the School Survey (n=12,957). Some of these schools did not have administrators, in which case the school was asked to return the questionnaire, but, with few exceptions, there was a one-to-one correspondence between the SASS samples of schools and school administrators.

1.2.3 Teacher Demand and Shortage Survey

The Teacher Demand and Shortage (TDS) Survey had two components: public schools and private schools.

For the public school sector, the target population consisted of all U.S. public school districts. These public school districts, often called local education agencies (LEAs), are government agencies administratively responsible for providing public elementary and/or secondary education. LEAs associated with the selected schools in the school sample received a TDS questionnaire. An additional sample of districts not associated with schools was selected and also received the TDS questionnaire. The target sample size was 5,424.

For the private school sector, the target population consisted of all U.S. private schools. Thus, the target sample size was the same as the private school sample of 3,270. The school questionnaire for the selected private schools included TDS questions for the school.

1.2.4 Teacher Survey

The target population for the Teacher Survey consisted of full-time and part-time teachers whose primary assignment was teaching in kindergarten through grade 12 (K-12). Data were collected from a sample of classroom teachers in each of the public and private schools that was included in the sample for the School Survey: the selected schools were asked to provide teacher lists for their schools and then those lists were used to select 56,051 public and 9,166 private school teachers. The survey designs for the public and private sectors were very similar. Within each selected school, teachers were stratified into one of five types in hierarchical order, as 1) Asian or Pacific Islander, 2) American Indian, Aleut, or Eskimo, 3) Bilingual/ESL (English as a Second Language), 4) New (less than three years teaching experience), or 5) Experienced (three or more years of teaching experience). Within each stratum, teachers were selected systematically with equal probability.

1.3 Accuracy of Estimates

SASS estimates are based on a sample; they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same questionnaire, instructions, and data collection procedure. There are two types of *errors* possible with an estimate based on a survey sample: *nonsampling errors* and *sampling errors*. We can provide estimates of the magnitude of SASS sampling errors, but not for nonsampling errors. The following of this section describes sources of nonsampling and sampling errors. The next sections describe sources of SASS nonsampling errors, followed by a discussion of sampling errors, their estimation, and their use in data analysis.

1.3.1 Nonsampling variability

Nonsampling errors can be attributed to many sources; e.g., inability to obtain information about all cases in the sample, definitional difficulties, differences in the interpretation of questions, inability or unwillingness on the part of the respondents to provide correct information, inability to recall information, errors made in collection such as in recording or coding the data, errors made in processing the data, errors made in estimating values for missing data, biases resulting from the differing recall periods caused by the interviewing pattern used, and failure of all units in the universe to have some probability of being selected for the sample (undercoverage). Quality control and edit procedures were used to reduce errors made by respondents, coders, and interviewers. For a further discussion, see *SASS Quality Profile* (Jabine 1994).

Undercoverage in SASS results from missed schools and from missed principals and teachers within sample schools. NCES used complex techniques to adjust the weights for nonresponse; the success of these techniques in avoiding bias has been examined (Synectics 1995).

1.3.2 Sampling Variability

Sampling errors are attributed to sampling variation; i.e., the variation that occurs by chance, because a sample, rather than a population, is surveyed. The sampling errors also partially measure the effect of some nonsampling errors in response and enumeration, but do not measure any systematic biases in the data. The reliability of an estimate is usually described in terms of a standard error (the square root of the estimated variance) that is primarily a measure of sampling variation; i.e., the variation that occurs by chance, because a sample, rather than a population, is surveyed. The chances are 68 out of 100 that an estimate from the sample would differ from a complete census figure by less than the standard error.

1.4 Uses of Standard Errors

1.4.1 Estimation/Confidence Intervals

A sample estimate and its associated standard error enable one to construct confidence intervals--ranges that include the average result of all possible samples with specified probabilities. For example, if all possible samples were selected with each being surveyed under essentially the same conditions and using the same sampling design, and if an estimate and associated standard error were calculated from each sample, then:

(1) Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average estimate from all possible samples.

(2) Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average estimate from all possible samples.

(3) Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average estimate from all possible samples.

The average estimate derived from all possible samples may or may not be contained in any particular computed confidence interval. However, for a particular sample, one can say with a specified confidence that the average estimate derived from all possible samples would be included in the confidence interval.

1.4.2 Hypothesis Testing

Standard errors may also be used for hypothesis testing, a statistical technique for distinguishing between population characteristics using sample estimates. The most common type of hypothesis testing is to test that the population characteristics among a set of groups are same against that they are different. Tests may be performed at various levels of significance, where a level of significance is the chance of concluding that the characteristics are different while, in fact, they are identical.

To perform the most common hypothesis test to compare a population characteristic between two groups, compute the difference $X_A - X_B$, where X_A and X_B are sample estimates of the population characteristic of interest for the two groups. Let se_{DIF} be the standard error of the difference $X_A - X_B$. If the value of $(X_A - X_B)/se_{DIF}$ is between -1.96 and 1.96, no conclusion about the difference of the characteristics between the two groups would be justified at the 5 percent significance level. If, however, $(X_A - X_B)/se_{DIF}$ is smaller than -1.96 or greater than 1.96, the observed difference would be justified significant at the 5 percent significance level. In this case, it is commonly accepted practice to say the characteristics are different between the two groups. Of course, sometimes this conclusion might be wrong. When the characteristics are, in fact, the same, there is a 5 percent chance of concluding that they are different. The test conducted here is called the *z-test*, where z is obtained from the standard normal distribution tables and 1.96 is called the critical value of the test at the 5 percent significance level. This test is applicable when the sample sizes from the two groups are sufficiently large so that the central limit theorem holds. If, however, the sample sizes are not sufficiently large, one has to assume that the two populations from which the samples are drawn are approximately normally distributed and the appropriate test is the *t*-test. The t-test has a somewhat similar formulation to the z-test described above and uses 't' tables for critical values instead of the standard normal tables (Ott 1977). All statistical software can perform t-tests and include as output a statistic called a p-value indicating the observed significance level: if the p-value is less than 0.05, that is, the observed significance level is below the specified 5 percent significance level, the difference is justified significant; otherwise, it is not significant.

Note that as more hypothesis testings are performed, more erroneous significant differences may occur. For example, if 100 independent testings were performed at the 5 percent significance level in which there are no real differences, it is likely that about 5 erroneous conclusions would occur. Therefore, if a large number of testings are performed, the significance of any single test should be interpreted cautiously or a Bonferroni significance level adjustment (Mendenhall et al. 1981) should be made for each of the tests. This adjustment procedure will ensure that *all* of the confidence intervals will enclose their respective parameters with *at least* a certain probability.

1.4.3 Reliability of an Estimated Proportion

This section refers to the proportions of a group of individuals possessing particular attributes such as the proportion of teachers in public schools who are Hispanic. The reliability of an estimated proportion, computed by using sample data for both numerator and denominator, depends upon both the size of the proportion and the magnitude of the totals upon which the proportion is based. Estimated proportions are relatively more reliable than the corresponding estimates of the numerators of the proportions, particularly if the proportions are 0.5 or more (Short and Littman 1989).

1.5 Computation of Complex Survey Standard Errors

Complex sample designs--those that use stratification, clustering, unequal selection probabilities, and multi-stage sampling, such as SASS--require procedures for estimating sampling variation that are markedly different from the ones that apply when the data are from a simple random sample. In general, such complex designs yield statistics with larger standard errors than those from a simple random sample (Wolter 1985).

A class of techniques, called replication methods, provides a general approach to estimating standard errors for the types of sample designs and weighting procedures usually encountered in complex sample surveys such as SASS. In particular, the *balanced half-sample replication* (also called *balanced repeated replication*, abbreviated as BRR) method, as a direct estimation method, has been used to estimate the standard errors associated with the estimates for all of the 1990-91 SASS surveys. NCES has prepared public use data files for the 1990-91 SASS which include a set of 48 weighted replicates designed to produce balanced half-sample replication variance estimates (Kaufman and Huang 1993, Gruber et al. 1994). For a more detailed description of the balanced half-sample replication method, users are referred to section 1.3, Volume II of this publication.

The set of 48 BRR weighted replicate provided in the 1990-91 SASS public use data files can be utilized only by users who have software available to perform the balanced half-sample replication estimation. One instance of such software is a SAS (Statistical Analysis System) user-written procedure called PROC WESVAR developed by Westat, Inc. (Westat, 1993), which computes basic survey estimates and their associated sampling errors for user-specified characteristics. PROC WESVAR supports a BRR option which should be used along with the replicate weights which are prepared externally and supplied in the data file for estimation of sampling errors. In this manual, without indication, all standard errors, referred to as directly estimated, were produced through the BRR procedure using WESVAR.

With a variance estimation procedure such as BRR described above, it is possible to compute and show a standard error for each survey estimate in the results tables of SASS reports. However, the SASS data set contains approximately 1,500 variables. In addition, statistics such as totals, averages, proportions, and differences with respect to various subpopulations can also be estimated. Even if each published sample estimate was accompanied by its standard error, one could not predict the combinations of results (ratios, differences, etc.) that might be of interest to the user. Users will therefore not always find individual standard errors for each estimate published in SASS reports or other additional estimates of interest. The statistical software WESVAR, and another, SUDAAN (Shah et al. 1992), a main software for complex survey variance estimation, are not widely available for users to compute standard errors. These are the practical reasons that more general analytical techniques are desirable.

Standard errors, when estimated from sample data, are themselves subject to sampling error. The standard error for a survey statistic of interest generally has a larger relative (with respect to the magnitude of the standard error) sampling error than that for the estimated statistic. Thus the estimates of standard errors may vary considerably from one time of estimation to another or among related characteristics (that might be expected to have nearly the same magnitude of relative sampling error). Therefore, some techniques of stabilizing the standard error or variance estimates, for example, by generalizing or by averaging, are desired to improve their usefulness.

Empirical studies (Synectics 1992 and Volume II of this publication) have shown that appropriately formed groups of SASS statistics tend to have similar *design effects* (see section 2) and similar behavior, in some sense, of the *relative variance* (see section 3). Based on these studies, two general methods have been made available to calculate the standard errors for the 1990-91 SASS: the design effect method (section 2) and the generalized variance function (GVF) method (section 3), using the tables provided with this manual (appendix II and appendix III). Section 1.6 below describes, first, all the groups of statistics for which average design effects and GVFs are available from the tables. We will show how to use these tables in the following sections.

1.6 Groups of Statistics

NCES publishes SASS statistics for many characteristics (e.g., number of K-12 students in the U.S.) and some standard subpopulations (e.g., public and private schools). Based on these publications, and in anticipation of various combinations of results (e.g., totals, averages, and proportions) being of interest to users, table 1.1 below lists the groups of statistics for use in computing standard errors.

The first level of grouping was one of the four surveys: School, School Administrator, Teacher Demand and Shortage (TDS), or Teacher. There are a very large number of certainty and high probability districts in the public TDS sample. These districts also contain a very large proportion of the total number of teachers and students. For the complex SASS design, these districts contribute very little to the variance estimates of totals and averages. However, for a simple random sample design, these same districts do contribute a very large part of the variance estimates of totals and averages. Due to these differences in variance contribution, and depending on the subpopulation, the design effects can vary greatly. Often these design effects can be extremely small (design effects less than 0.2 are not uncommon). Hence, an average design effect would be inappropriate. District proportions have the same problem, but to a lesser extent. For this reason, we do not present average design effects or GVF tables for the public TDS.

The second level of grouping was within each survey--either totals, averages, or proportions were grouped together. For example, if a user needs to estimate the standard error of "the number of students in K-12 who are Hispanic," the user would first locate the correct design effect or GVF table based on one of these groups. In this example, the variable of interest (students in K-12 who are Hispanic) is found in the School Survey and the estimate of interest is a **total**; i.e., the total number of students. Therefore, the correct table to use would be found in the group labeled "School Survey - Student Totals."

Table 1.1 -- Groups of statistics in 1990-91 SASS

Survey	Group of Statistics
School	Student Totals (e.g., number of students enrolled in 1st grade) Teacher Totals (e.g., number of full-time K-12 teachers) School Proportions (e.g., proportion of schools offering kindergarten)
School Administrator	Administrator Totals (e.g., number of administrators with master's degrees) Administrator Proportions (e.g., proportion of male administrators)
Teacher Demand and Shortage (Private)	TDS Totals (e.g., number of full-time equivalent teachers with state certification) TDS Proportions (e.g., proportion of districts with retraining offered teachers: special education)
Teacher	Teacher Totals (e.g., number of male teachers) Teacher Averages (e.g., average number of years as a part-time teacher) Teacher Proportions (e.g., proportion of married teachers)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1990-91.

Table 1.2 describes the subpopulations available for each group of statistics in the four SASS surveys, and table 1.3 provides definitions of each subpopulation. For example, a user may need to estimate the standard error of the number of students in grades K-12 who are Hispanic in **private schools**. The subpopulation of interest in this example is "private schools," and the standard error is calculated by using the parameters available in the row labeled "Private" (under the subpopulation heading "Sector") in either the design effect or GVF table labeled "School Survey - Student Totals."

Table 1.2 -- Relevant subpopulations for groups of statistics in 1990-91 SASS

Survey	Subpopulation for each group of statistics
School	Sector
	Region
	Region within Sector
	School Level within Sector
	School Level within State (elementary and secondary public schools)
	Typology (private schools only)
	Community Type within Sector
	State (public schools only)
	School Size within Community Type within Sector
	Minority Status (of Students) within Community Type within Sector
School Administrator	Sector
	Region
	State (public schools only)
	Region within Sector
	School Level within Sector
	School Level within State (elementary and secondary public schools)
	Typology (private schools only)
Teacher Demand and Shortage (Private Only)	Region
	Typology
	School Level
	Minority Status (of Students)
Teacher	Sector
	Region
	Region within Sector
	Minority Status (of Students) within Sector
	State (public schools only)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1990-91.

Table 1.3 -- Definition of subpopulations in 1990-91 SASS

Subpopulation	Definition	
Sector	Public or Private Schools	
Region		
Northeast	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania	
Midwest	Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas	
South	Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas	
West	Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii	
School Level	Elementary (no grade higher than 8 and at least one of grades 1-6), Secondary (grades 7-12), and Combined (any other combination of grades; e.g., 4-9, or 5-12)	
Typology	The private school typology separates private schools into three major groups and within each group into three subgroups: Catholic (parochial, diocesan, and private order), other religious (Conservative Christian, affiliated, and unaffiliated), and nonsectarian (regular, special emphasis, special education) (McMillen and Benson 1991)	
School Size	Enrollment of fewer than 150 students Enrollment of 150 to 499 students	Enrollment of 500 to 749 students Enrollment of 750 or more students
Community Type	Central City includes large central cities (Central cities of Standard Metropolitan Statistical Areas (SMSAs), with populations greater than or equal to 400,000 or population densities greater than or equal to 6,000 per square mile) and mid-size central cities (central cities of SMSAs, but not designated as large central cities). Urban Fringe/Large Town includes the urban fringes of large or mid-size cities (places located within SMSAs of large or mid-size central cities and defined as urban by the U.S. Bureau of the Census) and large towns (places not located within an SMSA, but that have populations greater than or equal to 25,000 and that are defined as urban by the U.S. Bureau of the Census). Rural/Small Town includes rural areas (places that have populations of fewer than 2,500 and that are defined as rural by the U.S. Bureau of the Census) and small towns (places not located within SMSAs, that have populations of fewer than 25,000, but greater than or equal to 2,500, and that are defined as urban by the U.S. Bureau of the Census).	
Minority Status	Minority enrollment (sum of all racial/ethnic groups other than white) of less than 20 percent, or greater than or equal to 20 percent.	
Field of Teaching	elementary general elementary special education elementary other secondary math secondary science	secondary English secondary social studies secondary vocational education secondary special education secondary other

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1990-91.

2. Average Design Effects and Approximate Standard Errors

Regardless of which method is used to calculate the standard errors for statistics derived from the SASS data, they will be different from the standard errors that are based on the assumption that the data are from a simple random sampling. The SASS complex design differs from the simple random sampling. The impact of the complex design on the accuracy of a sample estimate, in comparison to the alternative simple random sampling, is often measured by the *design effect* (Deff), defined as the following ratio:

$$Deff = \frac{var_{COMPLEX}}{var_{SRS}}$$

$$= \frac{sampling\ variance\ of\ complex\ sample}{sampling\ variance\ of\ simple\ random\ sample}$$

One may think of this ratio as a measure of the efficiency of the actual design.

In a large scale sample survey such as SASS, data are collected for a large number of variables. This necessitates that the design effects be computed for at least some key variables. The average of these design effects can be considered as a measure of the efficiency of the survey design compared to the alternative simple random sampling. For the 1990-91 SASS, accordingly, an average design effect was derived for each group of statistics (table 1.1) and, within each group, for each classification of each subpopulation (table 1.2).

2.1 Design Effects and Their Use

Standard errors of complex survey statistics of various groups for various subpopulations can then be calculated approximately from the corresponding standard errors based on the alternative simple random sample and the average design effects corresponding to the groups and subpopulations. The calculation formula for the standard error of an estimate is expressed as follows:

$$se_{COMPLEX} = \sqrt{Deff \times v_{SRS}}$$

$$= \sqrt{Deff} \times se_{SRS}$$

where v_{SRS} is the estimated variance of the estimate from a simple random sample, and se_{SRS} is the corresponding standard error. The calculation formulas for v_{SRS} from sample data for three basic types of estimates, totals, averages, and proportions, are provided below. Let x be the variable of interest with sample values x_i, $i = 1,\ldots,n$.

2.1.1 Calculation of Simple Random Sample Variance for Totals:

$$\begin{aligned} v_{SRSTOT} &= \left(\sum_1^n w_i\right)^2 \frac{1}{n} \frac{\sum_1^n w_i(x_i - \bar{x}_w)^2}{\sum_1^n w_i - 1} \\ &= \left(\sum_1^n w_i\right)^2 \frac{1}{n} s_w^2 \end{aligned}$$

where w_i are the weights, n is the number of respondents in the sample,

$$\bar{x}_w = \frac{\sum_1^n w_i x_i}{\sum_1^n w_i},$$

and

$$s_w^2 = \frac{\sum_1^n w_i (x_i - \bar{x}_w)^2}{\sum_1^n w_i - 1}.$$

The above formula for v_{SRSTOT} can be written in terms of the standard error, say,

$$\begin{aligned} se_{SRSTOT} &= \left(\sum_1^n w_i\right) \frac{s_w}{\sqrt{n}} \\ &= \left(\sum_1^n w_i\right) se_{SRSAVG}. \end{aligned}$$

Remark The quantity $s_w/n^{1/2} = se_{SRSAVG}$ is the standard error of the (weighted) mean of x (see section 2.1.2). It can be computed from SAS or SPSS procedures. An illustration of the SAS codes, using PROC MEANS, for computing se_{SRSAVG} and the total weight is provided below (SAS Institute Inc. 1990):

```
PROC MEANS DATA=SAS-data
    VARDEF=WDF VAR STD STDERR SUMWGT;
    VAR x;
    WEIGHT weight;
RUN;
```

where x is the variable for which the standard error of the (weighted) mean is requested, and *weight* is the variable for weights. The statistics VAR (the variance) and STD (the standard deviation) are included here for illustration purpose. The option VARDEF=WDF specifies the sum of weights minus one being used as the divisor in the calculation of the weighted VAR (as the s_w^2 above). The statistic STDERR (the standard error of the mean) is the desired se_{SRSAVG}, which is calculated by the weighted STD (as the s_w above) divided by the square root of the number of observations (as the n above). The statistic SUMWGT gives the total weight.

Note SAS is designed only for analyzing samples from infinite populations. To make the statistic STDERR in the form based on infinite population sampling, starting in release 6.11, with the procedures MEANS, SUMMARY, TABULATE and UNIVARIATE, the statistic STDERR for weighted mean will be calculated as the weighted STD (with VARDEF=DF) divided by the square root of the sum of weights. To use SAS 6.11 to compute se_{SRSAVG}, the codes need be modified accordingly.

Example 1 Consider the total enrollment of public school students in rural communities in K-12 plus those who are ungraded. In the School Survey data file, the variable is named ENRK12UG (Total Rural School Enrollment K-12 Plus Ungraded) (Gruber et al. 1994, appendix D-2). There are $n = 4{,}993$ records belonging to the subpopulation of interest, Public/Rural (i.e., Public/Rural-Small Town) under Sector/Community Type. Using the above SAS procedures, we can get $se_{SRSAVG} = 4.1119$, and the total weight 40,352. Thus, the simple random sample standard error for a total is the product of the se_{SRSAVG} and the total weight:

$$se_{SRSTOT} = 40{,}352 \times 4.1119 = 165{,}923.39.$$

Referring to the School Survey Design Effects table in appendix II, page II-9, the design effect for student total for the subpopulation Public/Rural under Sector/Community Type is Deff = 1.8167. Using the first equation of section 2.1 to calculate the approximate standard error for the total enrollment of public school students in rural communities in K-12 plus ungraded, we can substitute the above obtained values for se_{SRSTOT} and Deff:

$$\begin{aligned} se_{TOT} &= \sqrt{Deff} \times se_{SRSTOT} \\ &= \sqrt{1.8167} \times 165{,}923.39 = 223{,}639.9. \end{aligned}$$

A direct estimate for this standard error is, say, $se = 189{,}642.5$ (Choy et al. 1993, table B1, p.171). The relative difference in percent of se_{SRSTOT}, compared with the direct estimate se, is $100 \times |se_{DEFF} - se| / se = 100 \times |223{,}639.9 - 189{,}642.5| / 189{,}642.5 = 17.9(\%)$.

For users who are more familiar with SPSS than SAS, we provide below an illustration of the SPSS codes for computing se_{SRSAVG} and the total weight (SPSS Inc., 1993a):

```
GET FILE=SPSS-data.
COMPUTE wvar=1.
EXECUTE.
WEIGHT BY weight.
DESCRIPTIVES VARIABLES=wvar
   /STATISTICS=SUM.
DESCRIPTIVES VARIABLES=x
   /STATISTICS=SEMEAN.
```

where x is the variable for which the standard error of the (weighted) mean is requested, and *weight* is the variable for weights. The first DESCRIPTIVES computes the sum of weights. In the second DESCRIPTIVES, the statistic SEMEAN, defined also as the standard error of the mean, is calculated as the weighted standard deviation divided by the square root of the sum of weights (SPSS Inc. 1993b), differently from SAS. Thus an additional calculation is needed to get the desired se_{SRSAVG}:

$$se_{SRSAVG} = \text{SEMEAN} \times \text{sqrt}\{\text{sum of weights} / \text{number of observations}\}.$$

2.1.2 Calculation of Simple Random Sample Variance for Averages:

$$\begin{aligned} v_{SRSAVG} &= \frac{1}{n} \frac{\sum_{1}^{n} w_i (x_i - \bar{x}_w)^2}{\sum_{1}^{n} w_i - 1} \\ &= \frac{1}{n} s_w^2 = \left(se_{SRSAVG}\right)^2 \end{aligned}$$

where w_i are the weights, and

$$\bar{x}_w = \frac{\sum_1^n w_i x_i}{\sum_1^n w_i}.$$

se_{SRSAVG}, as described in last section, can be obtained from SAS or SPSS.

Example 2 Consider the same variable and subpopulation as in Example 1, but for student average. The design effect for student average for the subpopulation Public/Rural (i.e., Public/Rural-Small Town) under Sector/Community Type, from the School Survey Design Effects table in appendix II, page II-9, is Deff = 1.6410. Then, with $se_{SRSAVG} = 4.1119$ from Example 1, the desired standard error is calculated as

$$\begin{aligned} se_{AVG} &= \sqrt{Deff} \times se_{SRSAVG} \\ &= \sqrt{1.6410} \times 4.1119 = 5.2674. \end{aligned}$$

2.1.3 Calculation of Simple Random Sample Variance for Proportions:

$$v_{SRSPROP} = \frac{p(1-p)}{n},$$

$$se_{SRSPROP} = \sqrt{\frac{p(1-p)}{n}}$$

where p denotes the estimate of proportion for a characteristic of interest, expressed as

$$p = \frac{\sum_1^n w_i I(i)}{\sum_1^n w_i}$$

where $I(i) = 1$ if the characteristic is present for the sampled unit and 0 if it is absent.

Example 3 Consider the proportion of private school teachers who have bachelor's degrees as highest degree earned. There are $n = 6{,}642$ teacher records belonging to the subpopulation Private under Sector. An estimated (weighted) proportion is $p = 0.619$ (Choy et al. 1993, table 3.7, where the listed value is the percentage, 61.9). Thus, using the equation specified above, the standard error of p from the alternative simple random sample is

$$se_{SRSPROP} = \{0.619 \times (1 - 0.619) / 6642\}^{1/2} = 0.0060.$$

The design effect for teacher proportion for the subpopulation Private under Sector, from the Teacher Survey Design Effects table in appendix II, page II-39, is Deff = 1.9053. An approximate standard error for the proportion of interest is calculated as:

$$\begin{aligned} se_{PROP} &= \sqrt{Deff} \times se_{SRSPROP} \\ &= \sqrt{1.9053} \times 0.0060 = 0.0083. \end{aligned}$$

An available direct estimate for this standard error is 0.009; see Choy et al. 1993, table B4, p.176, where the listed standard error, 0.90, being for percentage, is converted to the standard error, 0.009, for proportion. The relative (absolute) difference in percent of se_{PROP}, compared with the direct estimate, is $100 \times |0.0083 - 0.009|/0.009 = 7.8(\%)$.

2.2 Average Design Effect Tables

In appendix II, the tables give the average design effects for each survey and subpopulation. SASS users who do not have access to software for computing accurate standard errors can use the average design effects presented in these tables and the formulas in section 2.1 to approximate the standard errors of statistics based on the SASS data.

2.3 Outlier Variables in the Average Design Effect Groups

When examining the design effect tables, readers may notice some relatively high average design effects. These appear to be attributable to some highly skewed variables included in the surveys. Removal of those variables would produce homogeneous design effects. For surveys with a large number of variables, removal of a few highly skewed variables would not effect the calculation of average design effects. However, for some of the surveys in this study there were not many variables used in the average design effect calculation and therefore the highly skewed variables were kept in for calculating the average design effects. Table 2-1 below presents the highly skewed variables identified in each of the survey components.

Table 2.1 -- Variables with very high design effects

Survey	Type of estimate	Variable	Variable Label
School Survey	Student Totals	NUMBRPK NUMBR7 NUMBR8 BILINGNUM AFTERNUM	Number of students enrolled in pre-k Number of students enrolled in grade 7 Number of students enrolled in grade 8 Number of Bilingual Ed students Number of extended day students
School Administrator Survey	Totals	ASC017	Have a masters degree
	Average	ASC031	Number of years teaching experience before becoming a principal
	Average	ASC047	Number of years in other nonteaching, nonadministrator positions in elem/secondary education, e.g. a guidance counselor.
	Average	ASC048	Number of years in positions outside of elementary/secondary education.
Teacher Survey	Total	RACE=4	Race Ethnicity=White

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1990-91.

3. Generalized Variance Functions and Approximate Standard Errors

Sampling variance or the *relative variance* of a survey estimator (defined as the sampling variance divided by the square of the mean of the estimator) can be related to the mean (expectation) of the estimator by simple mathematical relationships (Wolter 1985). A *generalized variance function* (GVF) is such a mathematical model which can be used to calculate the variance estimates (or standard errors) for survey items by evaluating the model at the corresponding survey estimates, avoiding computations of direct estimation. Thus, survey estimates with similar behavior of the relative variance (or its square root, the *coefficient of variation* (CV)[1]) were grouped together. Appropriate GVF (with two model parameters A and B) was developed for each group of survey estimates. The GVF for a group can be used to describe the behavior of the relative variance for all survey estimates in that group. The model parameters A and B vary by the group of statistics (totals, averages, proportions) and by the subpopulation (e.g., public schools) to which the estimate applies. The GVF tables in appendix III of this manual provide the parameters A and B, according to the groups of statistics and subpopulations as described in section 1.6, to be used for 1990-91 SASS estimates of interest.

It is noticed that, unlike the design effect approach, the GVF approach involves no need to calculate the simple random sample variance estimates. With the GVF tables provided, the calculation of a standard error takes only three simple steps:

(1) Read the parameters A and B from the GVF table corresponding to the survey estimate (X) of interest;

(2) Evaluate the GVF model at the survey estimate X, that is, calculate

$$CV(\%) = \sqrt{A + B/X}.$$

(3) Calculate the associated standard error of X as $se = \mathrm{CV}(\%) \times X/100$.

Remark Because the CVs used to develop the GVF models were computed through WESVAR in the scale of percent (that is, 100 × (standard error/estimate)), the calculated CV from evaluating the GVFs will be also in the scale of **percent**. To get the CV to the normal scale, we need to divide by 100 the percent CV resulted from the GVF evaluation.

The R-squared column in the GVF table represents how well the model fits the 1990-91 SASS data. In practice, if a GVF has small R-squared value, say, less than 0.5, the GVF would not be considered appropriate for use. For the GVFs for the 1990-91 SASS, there are only a few such cases.

---

[1] CV is estimated by the standard error of the estimate divided by the estimate.

Procedures for using the tables of the GVF parameters for the calculation of standard errors are illustrated through examples given in the following of this section.

3.1 Illustration of the Use of GVF Tables

GVFs were developed for the calculation of standard errors of totals, averages, and proportions of interest in the SASS surveys. GVF tables for totals, averages (see section 3.3), and proportions, by various subpopulations, are provided in appendix III of this manual. The following examples use the GVF tables to obtain the standard error for a total and a proportion estimates.

Example 1 Consider the total number of public school students in rural communities (see Example 1 of section 2.1). Table 3.1 below is an extract of the School Survey GVFs for student totals table for the subpopulations of Sector/Community Type (appendix III, page III-26). This table shows the GVF coefficients for the subpopulation Public/Rural, $A = 0.919$, and $B = 8,244,388.289$.

The estimated total number of the Public/Rural students is $X = 15,695,586$ ($se = 189,642.5$) (Choy et al. 1993, table 2.1, p.6, and table B1, p.171). The generalized CV (in percent) is calculated, by the formula in above step (2), as

$$\mathrm{CV}(\%) = \{0.919 + (8,244,388.289/15,695,586)\}^{1/2} = 1.201777.$$

The GVF standard error (se_{GVF}) is then calculated as

$$\begin{aligned} se_{GVF} &= (\mathrm{CV}/100) \times X \\ &= (1.201777/100) \times 15,695,586 = 188,625.942. \end{aligned}$$

This result can be compared with the published standard error for the total, from direct estimation, 189,642.5, as listed above with the estimate X. They appear quite close with a relative (absolute) difference in percent of $100 \times |se_{GVF} - se\,|/se =$
$100 \times |188,625.9 - 189,642.5|/189,642.5 = 0.536(\%)$.

The R-squared column in the GVF table represents how well the model fits the 1990-91 SASS data. For this case, the R-squared value is 0.8801.

The standard error calculated in this example was calculated as 223,639.9, by the design effect approach, in example 1 of section 2.1, with a relative difference 17(%), as compared to the direct estimate 189,642.5. For this example, the GVF approach appears having better performance than the design effect approach.

Table 3.1 -- GVFs for student totals (School Survey) (GVF model: $CV(\%) = (A+B/X)^{1/2}$)

Sector / Community Type	Parameter		Measure of Fit
	A	*B*	*R*-squared
Public / Urban	4.260	11,127,626.44	0.6182
Public / Suburban	1.970	10,321,487.16	0.7684
Public / Rural	**0.919**	**8,244,388.289**	**0.8801**
Private / Urban	3.985	2,771,444.620	0.8751
Private / Suburban	5.076	3,600,659.902	0.7697
Private / Rural	16.455	4,420,924.491	0.7602

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1990-91 (School Questionnaires).

Example 2 Consider the proportion of private school teachers with bachelor's degree as highest degree earned. Table 3.2 is an extract of the Teacher Survey GVFs for teacher proportions table for the subpopulations of Sector (appendix III, page III-101). This table shows the GVF coefficients for the subpopulation Private, $A = -2.6522$, and $B = 2.6695$.

The estimated proportion of the private school teachers with bachelor's degree is $X = 0.619$ ($se = 0.0090$) (Choy et al., 1993, table 3.7, p.45, and table B4, p.176. Listed in these tables are the estimated percentage, 61.9, and the associated standard error, 0.90. This percentage can be converted to proportion as 0.619, by a division by 100, and similarly the associated standard error converted to 0.0090). The generalized CV (in percent) is calculated, by the formula in above step (2), as

$$CV(\%) = \{-2.6522 + 2.6695/0.619\}^{1/2} = 1.2886.$$

The GVF standard error (se_{GVF}) of the estimated proportion is then calculated as

$$\begin{aligned} se_{GVF} &= (\mathrm{CV}/100) \times X \\ &= (1.2886/100) \times 0.619 = 0.007976. \end{aligned}$$

This result can be compared with the published standard error, from direct estimation, 0.0090, as listed above with the estimate *X*. The relative (absolute) difference in percent is $100 \times |se_{GVF} - se|/se = 100 \times |0.007976 - 0.0090|/0.0090 = 11.4(\%)$. The *R*-squared value for this GVF is quite high as 0.9807, listed in the *R*-square column of table 3.2.

The standard error calculated in this example was calculated as 0.0083, by the design effect approach, in example 3 of section 2.1, with a relative difference 7.8(%), also compared to the direct estimate 0.0090. For this example, the design effect approach appears having better performance than the GVF approach.

Table 3.2 -- GVFs for teacher proportions (Teacher Survey) (GVF model: $CV(\%) = (A+B/X)^{1/2}$)

Sector	Parameter		Measure of Fit
	A	*B*	*R*-squared
Public	-0.5385449013	0.5372155053	0.9725
Private	**-2.652233929**	**2.669488096**	**0.9807**

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1990-91 (Teacher Questionnaires).

They might, of course, both perform poorly in some other cases. Generally, the two approaches lie on the same theoretical ground: an appropriately formed group of statistics for a subpopulation has similar behavior in the sampling variance. GVF and design effect represent two aspects of the similarity. Methodologically, regarding their applicability and accuracy delivered, they are considered in the same category. Therefore, there is no general criterion can be established for making decision of selecting between the two approaches.

3.2 Standard Error of a Ratio

To estimate the relative variance of an estimated proportion $\hat{R} = \hat{X} / \hat{Y}$,

where $\hat{Y}$ is an estimator of the total number of individuals in a certain subpopulation and $\hat{X}$ is an estimator of the number of those individuals with a certain attribute.

When $\hat{R}$ and the denominator $\hat{Y}$ are approximately uncorrelated, the relative variance V^2_R of $\hat{R}$ can be approximately calculated from the relative variances V^2_X of $\hat{X}$ and V^2_Y of $\hat{Y}$ by

$$V^2_R = V^2_X - V^2_Y. \tag{1}$$

Formula (1) has been shown to produce useful approximations. The estimate of V^2_X and V^2_Y can be read, approximately, from the appropriate GVF tables. $\hat{X}$ and $\hat{Y}$ are usually in the same group of statistics. With Model 1, more specifically, it follows

$$V_R^2 = B(\hat{X}^{-1} - \hat{Y}^{-1}).$$

This approach of approximating the relative variance of a proportion could be applied to ratios, under a similar assumption, that is, the correlation between the ratio $\hat{R}$ and the denominator $\hat{Y}$ is close to 0. The following is an illustrative example.

Example Consider the student-teacher ratio for national public schools. The teacher number in each school counted is for the full-time-equivalent (FTE) teachers, which is calculated as a combination of the numbers of full-time teachers and part-time teachers in the following way, according to the NCES guideline:

FTE teachers = full-time teachers + 0.54 part-time teachers.

(In SASS School Survey files, the variable for the number of full-time teachers in school is FULTEACH, and for the number of part-time teachers in school is PARTEACH. The variable for the number of students in school is ENRK12UG.)

The following table lists, for national public schools, the estimates of the student total, FTE teacher total, and their ratio, and the associated standard errors, as directly estimated via BRR. For convenience, a last column for CV (in percent) is added to the table.

Table 3.3 -- Student and teacher totals and their ratio for public schools

Variable	Total	Standard error	CV(%)
Students (*X*)	40103699	362552.64	0.9040
FTE teacher (*Y*)	2439057	20331.12	0.8336
Students/FTE teacher (*R*)	16.4423	0.05863	0.3566

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1990-91.

Now use the formula $V^2_R = V^2_X - V^2_Y$, to calculate the CV for the ratio from the CVs for the numerator and the denominator of the ratio,

$$
\begin{aligned}
CV_R &= \{(CV_X)^2 - (CV_Y)^2\}^{1/2} \\
&= (0.9040^2 - 0.8336^2)^{1/2} = 0.3498.
\end{aligned}
$$

This result of CV (in percent) is very close to the directly estimated CV (in percent) for the ratio, 0.3566, as listed in table 3.3. The relative (absolute) difference is $100 \times |0.3498 - 0.3566|/0.3566 = 1.9(\%)$.

We also use the GVF estimates of the relative variances for *X* and *Y*. From the School Survey GVFs for Student Totals table (appendix III, page III-19) under the subpopulation Public of Sector, the GVF parameters for *X* are $A_X = 0.590$ and $B_X = 9872132.241$. The relative variance for *X* is then calculated as

$$
\begin{aligned}
V_X^2 &= A_X + B_X/X \\
&= 0.590 + 9872132.241/40103699 \\
&= 0.8362.
\end{aligned}
$$

And from the School Survey GVFs for Teacher Totals table (appendix III, page III-35) under the subpopulation Public of Sector, the GVF parameters for *Y* are $A_Y = 0.6880$ and $B_Y = 119403.0681$. The relative variance for *Y* is then calculated as

$$
\begin{aligned}
V_Y^2 &= A_Y + B_Y/Y \\
&= 0.6880 + 119403.0681/2439057 \\
&= 0.7370.
\end{aligned}
$$

Thus the relative variance for R is calculated as

$$\begin{aligned} V_r^2 &= V_x^2 - V_y^2 \\ &= 0.8362 - 0.7370 = 0.0992, \end{aligned}$$

and the corresponding CV_R (in percent) is 0.3150. This result is fairly close to the directly estimated CV (in percent) for the ratio, 0.3566 (table 3.3). The relative (absolute) difference is $100 \times |0.3150 - 0.3566|/0.3566 = 11.7(\%)$.

Remark The assumption that $\hat{R}$ and $\hat{Y}$ are uncorrelated is critical for the formula (1) to give useful approximations. In practice, the relative variance estimate for the numerator may be smaller than that for the denominator, resulting in a negative relative variance for the ratio. This circumstance is an indication that the assumption is violated. In the case that the ratio is a proportion, and Model 1 GVF estimates are valid for the relative variances of $\hat{X}$ and $\hat{Y}$, the negative relative variance problem will not occur.

3.3 Standard Error of an Average

The standard error of an **average** can be derived approximately from the standard error of the corresponding **total** according to the following formula:

$$se_{COMPLEXAVG} = \frac{se_{COMPLEXTOT}}{\sum_{1}^{n} w_i}$$

where $se_{COMPLEXTOT}$ is the standard error associated with a total type estimate, either obtained using a GVF table or directly estimated, and w_i are the weights. The above formula is approximate because the domain over which the weights are summed (in the denominator) can vary randomly. The summing of weights is over the sample units within the group of interest. This total weight provides an estimated total number of individuals in the subpopulation defined by that group. For example, for the variable NUMBR4: "NMBR STUDENTS ENROLLED IN 4TH GRADE" in the School Survey (Gruber et al. 1994, appendix D-13), if our interest is in the Public/Region NE group, the total of weights would sum up the weights of the public schools in the sample which belong to the Northeast region; the total weight would be an estimated total number of public schools in the Northeast region.

Tables of total weights of the sample units over various subpopulations of interest are provided for each survey with this manual (appendix IV). However, it should be noticed that the total weights in these tables were calculated according to **all** sample units belonging to the subpopulation. That is, all sample units were considered as respondents. But that might not be the real case. For survey totals with a high item nonresponse rate, using the total weights corresponding to all sample units may cause unignorable error, resulting in an underestimate of the standard error for the average. There seems no convenient way to incorporate the individual item nonresponse rates into the tables of total weights which are produced for general use. In the case that, as mentioned above, the item nonresponse rate is high, caution must be taken and users are urged to calculate the total weights individually for that item by summing up weights over only the respondents for that item in the sample.

The following example illustrates the use of the formula.

Example Consider the variable HISPNSTU (NMBR K-12 STUDENTS ARE: HISPANIC) in School Survey (Gruber et al. 1994, appendix D-11) and the group Public/Urban of Sector/Community Type. A directly estimated standard error by BRR for the total is $se_{COMPLEXTOT}$ = 102,238.68. The total weight for the (responding) schools in that group is calculated from the data as 18,683.82. The derived standard error for the average is then

$$se_{COMPLEXAVG} = 102{,}238.68 \,/\, 18{,}683.82 = 5.472.$$

A directly estimated standard error by BRR for the average is, say, se_{AVG} = 5.3435. Compare the two results, and calculate the relative difference in percent:

$$100\ (se_{COMPLEXAVG} - se_{AVG}) \,/\, se_{AVG}$$

$$= 100 \times (5.472 - 5.3435) \,/\, 5.3435 = 2.4\ (\%).$$

Also, we can use the GVF approach to estimate the standard error for total from the estimated total. For this example, the estimated total is X = 2,318,226.59. From the GVF table, the School Survey GVFs for student totals, for the group Public/Urban of Sector/Community Type, it is found that the estimated coefficients are: A = 4.26 and B = 11,127,626.44. Thus, by the GVF model,

$$\text{CV (in percent)} = (A + B/X)^{1/2}$$

$$= (4.26 + 11{,}127{,}626.44/2{,}318{,}226.59)^{1/2} = 3.01,$$

and the GVF modeled standard error for the total is

$$se_{COMPLEXTOT} = X \times \mathrm{CV}$$
$$= 2{,}318{,}226.59 \times 3.01/100 = 69{,}778.62.$$

Using this estimate of the standard error for the total, the derived standard error for the average is

$$se_{COMPLEXAVG} = 69{,}778.62/18{,}683.82 = 3.7347,$$

where 18,683.82 is the total weight. A comparison between this estimate and the direct estimate is given by the relative difference:

$$100\ (se_{COMPLEXAVG} - se_{AVG}) \,/\, se_{AVG}$$
$$= 100 \times |3.7347 - 5.3435| \,/\, 5.3435 = 30\ (\%).$$

This time the result from using GVF seems not to give satisfactory accuracy. It is noticed that the R-squared value for the GVF used is 0.6182, so the model didn't fit very well.

3.4 Outlier Variables Found in the GVF Groups

Users are cautioned that during the GVF modeling process some variables were found to be outliers; i.e., they differed considerably from that of most of the variables in a group. GVF models used for these variables will give poor results. Table 3.4 provides a list of specific variables for which GVFs may be inappropriate.

Table 3.4 -- Outlier variables found in the GVF Groups

Survey/Estimate	Subgroup	Variable	Label
School: Student Totals	Illinois/ Secondary	NUMBRPK	Number of students enrolled in pre-Kindergarten
School: Teacher Totals	North Dakota	ASIANTCH	Number of K-12 teachers that are Asian/Pacific Islander
School: Teacher Totals	Private/Rural/750+	SPCLNEW	Number of new K-12 teachers, main assignment: special ed
Administrator: Totals	Catholic/Private	ASC072	Problem : Student apathy
Administrator: Proportions	Kansas	ASC124	Of Hispanic origin
Administrator: Proportions	New York	ASC123	Enrolled in recognized tribe
Administrator: Proportions	North Carolina	ASC123	Enrolled in recognized tribe
Administrator: Proportions	Idaho/Elementary	ASC042	Participated in training for aspiring school administrators
Administrator: Proportions	Idaho/Elementary	ASC043	Completed the Indian Education Administration Program
Administrator: Proportions	Illinois/Elementary	ASC124	Of Hispanic origin
Administrator: Proportions	Kansas/Secondary	ASC124	Of Hispanic origin
Administrator: Proportions	New York/Elementary	ASC123	Enrolled in recognized tribe
Administrator: Proportions	New York/Secondary	ASC124	Of Hispanic origin
Administrator: Proportions	North Carolina/ Elementary	ASC123	Enrolled in recognized tribe
Administrator: Proportions	North Carolina/ Secondary	ASC123	Enrolled in recognized tribe

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1990-91.

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APPENDIX I

VARIABLES SELECTED FOR GVF FITTING

SCHOOL SURVEY
Variables Selected for Average Design Effects & GVF Fitting

Variables Used for Estimating Student Totals and Student Averages:

Name	Label
AMINDSTU	NMBR K-12 STUDENTS ARE: AMIND/ALASKAN
ASIANSTU	NMBR K-12 STUDENTS ARE: ASINA/PAC ISL
HISPNSTU	NMBR K-12 STUDENTS ARE: HISPANIC
BLACKSTU	NMBR K-12 STUDENTS ARE: BLACK/NONHISPANIC
WHITESTU	NMBR K-12 STUDENTS ARE: WHITE/NONHISPANIC
TOTALENR	TOTAL ENROLLMENT/SUM OF K-12 + UNGRADED
ONESVK12	NMBR K-12 CHAPTER 1 STUDENTS SERVED
NUMBRKG	NMBR STUDENTS ENROLLED IN KINDERGARTEN
NUMBR1	NMBR STUDENTS ENROLLED IN FIRST GRADE
NUMBR2	NMBR STUDENTS ENROLLED IN SECOND GRADE
NUMBR3	NMBR STUDENTS ENROLLED IN THIRD GRADE
NUMBR4	NMBR STUDENTS ENROLLED IN FOURTH GRADE
NUMBR5	NMBR STUDENTS ENROLLED IN FIFTH GRADE
NUMBR6	NMBR STUDENTS ENROLLED IN SIXTH GRADE
NUMBR7	NMBR STUDENTS ENROLLED IN SEVENTH GRADE
NUMBR8	NMBR STUDENTS ENROLLED IN EIGHTH GRADE
NUMBR9	NMBR STUDENTS ENROLLED IN NINTH GRADE
NUMBR10	NMBR STUDENTS ENROLLED IN TENTH GRADE
NUMBR11	NMBR STUDENTS ENROLLED IN ELEVENTH GRADE
NUMBR12	NMBR STUDENTS ENROLLED IN TWELTH GRADE
ABSNTST	NMBR K-12 STUDENTS ABSENT RECENT DAY
GRADNUM	NMBR 12TH GRADE STUDENTS GRADUATED LAST YR
NUMBRPK	NMBR STUDENTS ENROLLED IN PRE-K
NUMBRPS	NMBR STUDENTS ENROLLED IN POSTSECONDARY
NUMBRUG	NMBR STUDENTS ENROLLED IN UNGRADED
ESOLNUM	NMBR ESOL STUDENTS
BILNGNUM	NMBR BILINGUAL ED STUDENTS
READNUM	NMBR REMEDIAL READING STUDENTS
MATHNUM	NMBR REMEDIAL MATH STUDENTS
SPCLNUM	NMBR HANDICAPPED PROGRAM STUDENTS
GIFTDNUM	NMBR GIFTED/TALENTED PROGRAM STUDENTS
DIAGNNUM	NMBR DIAG/PRESCRIPTIVE SERVICE STUDENTS
ENROL12	NMBR STUDENTS IN 12TH GRADE LAST YR
AFTERNUM	NMBR EXTENDED DAY PROGRAM STUDENTS

Variables Used for Estimating Teacher Totals and Teacher Averages:

Name	Label
AMINDTCH	NMBR K-12 FTE TEACHERS ARE: AMIND/ALASKAN
ASIANTCH	NMBR K-12 FTE TEACHERS ARE: ASIAN/PAC ISL

HISPNTCH	NMBR K-12 FTE TEACHERS ARE: HISPANIC
BLACKTCH	NMBR K-12 FTE TEACHERS ARE: BLACK/NONHISP
WHITETCH	NMBR K-12 FTE TEACHERS ARE: WHITE/NONHISP
ELEMNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: ELEM.
FULTEACH	NMBR FULL-TIME K-12 TEACHERS
SPCLNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: SPEC ED
ENGLNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: ENGLISH
MATHNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: MATH
PHYSNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: PHYS. SCI
ESOLNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: ESOL
LANGNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: FOREIGN L
ABSNTCH	NMBR K-12 TEACHERS ABSENT MOST RECENT DAY
TECHNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: VOTECH
BLNGNEW	NMBR NEW K-12 TEACHERS MAIN ASSIGN: BILING
LFTTEACH	NMBR K-12 TEACHERS LEFT TEACHING
LFTGENL	NMBR LEFT TEACHERS MAIN ASSIGN: ELEMENTARY
LFTSPECL	NMBR LEFT TEACHERS MAIN ASSIGN: SPECIAL ED
LFTMATH	NMBR LEFT TEACHERS MAIN ASSIGN: MATH
LFTENGL	NMBR LEFT TEACHERS MAIN ASSIGN: ENGLISH
LFTPHYS	NMBR LEFT TEACHERS MAIN ASSIGN: PHYS. SCI
LFTBIO	NMBR LEFT TEACHERS MAIN ASSIGN: BIO/LIFE
LEES3EXP	NMBR K-12 TEACHERS TAUGHT LESS THAN 3 YRS
LESS10EX	NMBR K-12 TEACHERS TAUGHT LESS THAN 10 YRS
LESS21EX	NMBR K-12 TEACHERS TAUGHT 10-20 YRS
MOREXP21	NMBR K-12 TEACHERS TAUGHT OVER 20 YRS
LFTLANG	NMBR LEFT TEACHERS MAIN ASSIGN: FOREIGN L

Variables Used for Estimating School Proportions:

Name	Label
ESOLPGMP	ESOL AVAILABLE
BILNGPGP	BILINGUAL ED AVAILABLE
READPGMP	REMEDIAL READING AVAILABLE
MATHPGMP	REMEDIAL MATHEMATICS AVAILABLE
SPECLPGP	HANDICAPPED PROGRAMS AVAILABLE
GIFTDPGP	GIFTED/TALENTED PROGRAMS AVAILABLE
DIAGNPGP	DIAG/PRESCRIPTIVE SERVICES AVAILABLE
AFTERPGP	EXTENDED DAY PROGRAMS AVAILABLE
PKOFFERP	PREKINDERGARTEN OFFERED
KGOFFERP	KINDERGARTEN OFFERED
OWNLIBRP	SCHOOL HAS A LIBRARY/MEDIA CENTER
CHPTRONP	CHAPTER 1 SERVICES AVAILABLE
FREELNCP	STUDENTS ELIGIBLE FOR FREE LUNCHES

TEACHER SURVEY

Variables Selected for Average Design Effects & GVF Fitting

Variables Used for Estimating Totals:

Name	Label
TSC098	PARTICIPATED IN IN-SERVICE TRAINING OVER 30 HRS
TSC048	DEGREE OTHER THAN MASTERS?
TSC280	RECEIVE ADDITIONAL PAY AS MENTOR TEACHER?
TSC281	RECEIVE ADDITIONAL PAY FOR TEACHING SHTG FIELD?
TSC282	RECEUVE ADDITIONAL PAY TEACHING IN HIGH-PRIORITY
TSC283	SALARY INCREASES AS PART OF CAREER LADDER?
TSC284	RECEIVE MERIT PAY BONUS FOR PERFORMANCE?
TSC285	RECEIVE BONUS FOR SCHOOL'S PERFORMANCE?
TSC065	IS MAIN ASSIGN PRE-K, ELEM, OR SPEC ED?
TSC075	TEACH ANY STUDENTS GRADES 7-12?
TSC104	HAVE TEACHING CERT. IN YOUR OTHER TCH ASSIGN?
TSC110	PARTICIPATE IN FORMAL TEACHING INDUCTION?
TSC111	ARE YOU A MASTER OR MENTOR TEACHER?
TSC045	DO YOU HAVE MASTER'S DEGREE?
RACE	RACE
SEX	SEX

Variables Used for Estimating Averages:

Name	Label
TSC031A	NMBR YEARS AS FTE PUBLIC SCHOOL TEACHER
TSC032A	NMBR YEARS AS PART-TIME PUB SCH TEACHER
TSC036A	LENGTH OF BREAK IN SERVICE
TSC037A	NMBR OF CONSECUTIVE YEARS TEACHING
TSC074A	NMBR CONSECUTIVE YRS CURRENT ASSIGNMENT
TSC078A	NMBR UNDERGRAD MATH COURSES TAKEN
TSC079A	NMBR GRAD MATH COURSES TAKEN
TSC081A	NMBR UNDERGRAD COMPUTER SCIENCE COURSES TAKEN
TSC082A	NMBR GRAD COMPUTER SCIENCE COURSES TAKEN
TSC084A	NMBR UNDERGRAD BIOLOGY COURSES TAKEN
TSC087A	NMBR UNDERGRAD CHEMISTRY COURSES TAKEN
TSC090A	NMBR UNDERGRAD PHYSICS COURSES TAKEN
TSC093A	NMBR UNDERGRAD EARTH SCIENCE TAKEN
TSC096A	NMBR UNDERGRAD NATURAL SCIENCE TAKEN
TSC129A	ENROLLMENT IN YOUR CLASS RECENT FULL WEEK
TSC130A	HRS SPENT TEACHING ENGLISH PER WEEK
TSC131A	HRS SPENT TEACHING MATH PER WEEK
TSC132A	HRS SPENT TEACHING SOCIAL STUDIES PER WEEK
TSC133A	HRS SPENT TEACHING SCIENCE PER WEEK
TSC220A	HOURS SPENT AFTER SCHOOL

TSC221A	HRS SPENT OTHER SCHOOL ACTIVITIES
TSC277A	YEARS BEFORER RETIREMENT

Variables Used for Estimating Proportions:

Name	Label
TS028	TAUGHT ELEM/SECONDARY IN OTHER SECTOR
TS098	ATTENDED IN-SERVICE TRAINING OF 30+ HRS
TS048	HAVE ANY OTHER TYPE OF DEGREE
TS280	RECV PAY INCENTIVES FOR ADDL RESP
TS281	RECV PAY INCENTIVES FOR ADDL TCHING
TS282	RECV PAY INCENTIVES DUO TO SCHL LOCATION
TS283	RECV PAY INCENTIVES DUO TO PERFORMANCE
TS284	RECV MERIT PAY BONUS DUO TO PERFORM
TS285	RECV SCHL BONUS DUO TO EXCP PERFORM
TS062	COLLEGE LEVEL COURSES / TEACHING METHODS
TS065	MAIN ASSIGN PERKIND/ GENL ELEM/ SPEC ED
TS075	TEACH ANY 7-12 STUDENTS AT THIS SCHOOL
TS101	MAIN ASSIGN TEACHING CERT IN THIS STATE
TS104	CERT IN OTHER TEACHING THIS STATE
TS110	PARTICIPATE IN 1ST YR INDUCTION TRAINING
TS111	CURRENTLY MASTER OR MENTOR TEACHER
MARRIED	MARRIED
WHITE	WHITE
PROFORG	MEMBERSPROFESS TEACHER/ED ORGANIZATION
FULL	MAIN ASSIGNMENT AT THIS SCHOOL
BACH	HAVE A BACHLOR'S DEGREE
MAST	HAVE A MASTER'S DEGREE
MALE	MALE

TEACHER DEMAND AND SHORTAGE SURVEY

Variables Selected for Average Design Effects &
GVF Fitting

Variables Used for Estimating Totals (Private Schools):

Name	Label
ABOLISHD	NUMBER OF FULL-TIME EQ. K-12 TEACHING POSITIONS ABOLISHED
APPROVED	NUMBER OF FULL-TIME EQ. K-12 TEACHING POSITIONS APPROVED
APPRVLIB	NUMBER OF FULL-TIME LIB/MEDIA SPEC POSITIONS APPROVED
CERTIFY	NUMBER OF FULL-TIME EQ. TEACHERS WITH STATE CERTIFICATION
LAIDOFF	NUMBER OF FULL-TIME EQ. TEACHERS LAID OFF LAST YEAR
NEWHIRES	NUMBER OF FULL-TIME EQ. TEACHERS NEWLY HIRED
TKGLAST	NUMBER OF DISTRICT FULL-TIME EQ. TEACHERS LAST YR: KG
TKGNOW	NUMBER OF DISTRICT FULL-TIME EQ. TEACHERS THIS YR: KG
TOTLIBRY	NUMBER OF FULL-TIME K-12 LIBRARIANS/MEDIA SPECIALISTS
TPKLAST	NUMBER OF FULL-TIME EQ. TEACHERS LAST YR: PRE-K
TPKNOW	NUMBER OF FULL-TIME EQ. TEACHERS THIS YR: PRE-K
TPSLAST	NUMBER OF FULL-TIME EQ. TEACHERS LAST YR: POST-SECONDARY
TPSNOW	NUMBER OF FULL-TIME EQ. TEACHERS THIS YR: POST-SECONDARY
TTOTK_12	NUMBER FULL-TIME EQ. THIS YR: GRADES K-12
TTOTLAST	TOTAL NUMBER OF DISTRICT FULL-TIME EQ. TEACHERS LAST YEAR
TTOTNOW	TOTAL NUMBER OF DISTRICT FULL-TIME EQ. TEACHERS THIS YEAR
TUGLAST	NUMBER DISTRICT FULL-TIME EQ. TEACHER LAST YR: UNGRADED
TUGNOW	NUMBER DUSTRICT FULL-TIME EQ. TEACHER THIS YR: UNGRADED
T1_6LAST	NUMBER DISTRICT FULL-TIME EQ. TEACHER LAST YR: GRADES 1-6
T1_6NOW	NUMBER DISTRICT FULL-TIME EQ. TEACHER THIS YR: GRADES 1-6
T7_12LST	NUMBER DISTRICT FULL-TIME EQ. TEACHER LAST YR: GRADES 7-12
T7_12NOW	NUMBER DISTRICT FULL-TIME EQ. TEACHER THIS YR: GRADES 7-12
VACANCY	NUMBER FULL-TIME EQ. TEACHING POSITIONS VACANCT
VACNTLIB	NUMBER FULL-TIME EQ. LIB/MEDIA SPEC POSITIONS VACANT

Variables Used for Estimating Averages (Private Schools):

Name	Label
ABOLISHD	NUMBER FTE K-12 TEACHING POSITIONS ABOLISHED
APPROVED	NUMBER FTE K-12 TEACHING POSITIONS APPROVED
APPRVLIB	NUMBER FTE LIB/MEDIA SPEC POSITIONS APPROVED
CERTIFY	NUMBER TEACHERS WITH STATE CERTIFICATION
LAIDOFF	NUMBER TEACHERS LAID OFF LAST YEAR
NEWHIRES	NUMBER TEACHERS NEWLY HIRED
TKGLAST	NUMBER DISTRICT FTE TEACHERS LAST YR: KG
TKGNOW	NUMBER DISTRICT FTE TEACHERS THIS YR: KG
TOTLIBRY	NUMBER FTE LIBRARIANS/MEDIA SPECIALISTS
TPKLAST	NUMBER TEACHERS LAST YR: PRE-K
TPKNOW	NUMBER TEACHERS THIS YR: PRE-K
TPSLAST	NUMBER TEACHERS LAST YR: POST-SECONDARY

TPSNOW	NUMBER TEACHERS THIS YR: POST-SECONDARY
TTOTK_12	NUMBER FTE THIS YR: GRADES K-12
TTOTLAST	NUMBER OF DISTRICT FTE TEACHERS LAST YEAR
TTOTNOW	NUMBER OF DISTRICT FTE TEACHERS THIS YEAR
TUGLAST	NUMBER DISTRICT FTE TEACHER LAST YR: UNGRADED
TUGNOW	NUMBER DISTRICT FTE TEACHER THIS YR: UNGRADED
T1_6LAST	NUMBER DISTRICT FTE TEACHER LAST YR: GRADES 1-6
T1_6NOW	NUMBER DISTRICT FTE TEACHER THIS YR: GRADES 1-6
T7_12LST	NUMBER DISTRICT FTE TEACHER LAST YR: GRADES 7-12
T7_12NOW	NUMBER DISTRICT FTE TEACHER THIS YR: GRADES 7-12
VACANCY	NUMBER FTE TEACHING POSITIONS VACANCT

Variables Used for Estimating Proportions (Private Schools):

Name	Label
RETRAING	DISTRICTS WITH RETRAINING AVAILABLE IN SHTG. FIELDS
RESPECL	DISTRICTS WITH RETRAINING OFFERED TCHS: SPECIAL ED.
REMATH	DISTRICTS WITH RETRAINING OFFERED TCHS: MATHEMATICS
RECOMP	DISTRICTS WITH RETRAINING OFFERED TCHS: COMPUTER SCI
REPHYS	DISTRICTS WITH RETRAINING OFFERED TCHS: PHYSICAL SCI
REBIO	DISTRICTS WITH RETRAINING OFFERED TCHS: BIO/LIFE SCI
RESOL	DISTRICTS WITH RETRAINING OFFERED TCHS: ESL/BILING ED
RELANG	DISTRICTS WITH RETRAINING OFFERED TCHS: FOREIGN LANG
REVOTEC	DISTRICTS WITH RETRAINING OFFERED TCHS: VOCATIONAL
REOTHER	DISTRICTS WITH RETRAINING OFFERED TCHS: OTHER

Variables Used for Estimating Student Totals and Student Averages (Public Schools):

Name	Label
NOWUG	DISTRICT HEAD COUNT THIS YEAR: UNGRADED
LASTUG	DISTRICT HEAD COUNT LAST YEAR: UNGRADED
NOWPK	DISTRICT HEAD COUNT THIS YEAR: PRE-K
LASTPK	DISTRICT HEAD COUNT LAST YEAR: PRE-K
NOW1_6	DIST HEAD COUNT THIS YEAR: GRADES 1-6
LAST1_6	DIST HEAD COUNT LAST YEAR: GRADES 1-6
NOW7_12	DIST HEAD COUNT THIS YEAR: GRADES 7-12
LAST7_12	DIST HEAD COUNT LAST YEAR: GRADES 7-12
NOWPS	DIST HEAD COUNT THIS YEAR: POSTSECONDARY
LASTPS	DIST HEAD COUNT LAST YEAR: POSTSECONDARY
NOWTOT	TOTAL DIST HEAD COUNT ENROLLMENT THIS YR
LASTTOT	TOTAL DIST HEAD COUNT ENROLLMENT LAST YR
OTHRUG	NUMBER ATTEND OTHER DIST PART DAY: UNGRAD
OTHRKG	NUMBER ATTEND OTHER DIST PART DAY: KINDER
OTHR1_6	NUMBER ATTEND OTHER DIST PART DAY: 1-6
OTHR7_12	NUMBER ATTEND OTHER DIST PART DAY: 7-12
AMINDIST	NUMBR DIST K-12 STUDENTS: AMIND/ALASKAN
ASIADIST	NUMBR DIST K-12 STUDENTS: ASIAN/PAC ISL
HISPDIST	NUMBR DIST K-12 STUDENTS: HISPANIC
BLKDIST	NUMBR DIST K-12 STUDENTS: BLACK NONHISP.

WHTDIST	NUMBR DIST K-12 STUDENTS: WHITE NONHISP.

Variables Used for Estimating Teacher Totals and Teacher Averages (Public Schools):

Name	Label
ABOLISHD	NMBR FTE K-12 TEACHING POSITIONS ABOLISHED
ABOLSHLB	NMBR FTE LIB/MEDIA SPEC POSITIONS ABOLSHED
APPROVED	NMBR FTE K-12 TEACHING POSITIONS APPROVED
APPRVLIB	NMBR FTE LIB/MDEIA POSITIONS APPROVED
CERTIFY	NMBR FTE TEACHERS WITH STATE CERTIFICATION
LAIDOFF	NMBR FTE K-12 TEACHERS LAIDOFF LAST YEAR
LIBK_6	NMBR FTE K-6 LIBRARIANS/MDEIA SPECIALISTS
LIB7_12	NMBR FTE 7_12 LIBRARIANS/MEDIA SPECIALISTS
NEWCERTS	DIST NEW TEACHERS WITH STATE CERTIFICATION
NEWHIRES	DIST NMBR NEW TEACHERS HIRED
TCHAMIND	NMBR DIST K-12 TEACHERS: AMIND/ALASKAN
TCHASIAN	NMBR DIST K-12 TEACHERS: ASIAN/PAC ISL
TCHBLACK	NMBR DIST K-12 TEACHERS: BLACK NONHISPANIC
TCHISPNC	NMBR DIST K-12 TEACHERS: HISPANIC
TCHWHITE	NMBR DIST K-12 TEACHERS: WHITE NONHISPANIC
TKGLAST	NMBR DIST FTE TEACHERS LAST YR: KINDERGARTEN
TOTLIBRY	NMBR FTE K-12 LIBRARIANS/MDEIA SPECIALISTS
TPKLAST	NMBR DIST FTE TEACHERS LAST YR: PRE-K
TPKNOW	NMBR DIST FTE TEACHERS THIS YR: PRE-K
TPSLAST	NMBR DIST FTE TEACHERS LAST YR: POSTSECONDARY
TPSNOW	NMBR DIST FTE TEACHERS THIS YR: POSTSECONDARY
TTOTK_12	NMBR DIST FTE TEACHERS THIS YR: GRADES K-12
TTOTLAST	NMBR DIST FTE TEACHERS LAST YEAR
TTOTNOW	NMBR DIST FTE TEACHERS THIS YEAR
TUGLAST	NMBR DIST FTE TEACHERS LAST YR: UNGRADED
TUGNOW	NMBR DIST FTE TEACHERS THIS YR: UNGRADED
T1_6LAST	NMBR DIST FTE TEACHERS LAST YR: GRADES 1-6
T1_6NOW	NMBR DIST FTE TEACHERS THIS YR: GRADES 1-6
T7_12LST	NMBR DIST FTE TEACHERS LAST YR: GRADES 7-12
T7_12NOW	NMBR DIST FTE TEACHERS THIS YR: GRADES 7-12
VACANCY	NMBR FTE K-12 TEACHING POSITIONS VACANT
VACNTLIB	NMBR FTE LIB/MDEIA POSITIONS VACANT

Variables Used for Estimating Proportions (Public Schools):

Name	Label
RETRING	DIST HAS RETIRING AVAIL IN SHRTG FLDS
RESPECL	RETRAINING OFFERED TCHRS: SPECIAL ED
REMATH	RETRAINING OFFERED TCHRS: MATH
RECOMP	RETRAINING OFFERED TCHRS: COMPUTER SCI
REPHYS	RETRAINING OFFERED TCHRS: PHYSICAL SCI
REBIO	RETRAINING OFFERED TCHRS: BIO/LIFE SCI
RESOL	RETRAINING OFFERED TCHRS: ESL/BILING ED
RELANG	RETRAINING OFFERED TCHRS: FOREIGN LANG

REVOTEC	RETRAINING OFFERED TCHRS: VOCATIONAL ED
REOTHER	RETRAINING OFFERED TCHRS: OTHERS

SCHOOL ADMINISTRATOR SURVEY
Variables Selected for Average Design Effects & GVF Fitting

Variables Used for Estimating Totals:

Name	Label
ASC011	WAS PRINCIPAL HERE THE SPRING 1988
ASC013	BACHELORS DEGREE MAJOR FIELD OF STUDY
ASC015	HAVE A SECOND MAJOR OR MINOR FIELD OF STUDY
ASC016	SECOND MAJOR/MINOR FIELD OF STUDY
ASC017	HAVE A MASTERS DEGREE
ASC018	MASTERS DEGREE MAJOR FIELD OF STUDY
ASC020	HAVE ANY OTHER TYPE OF DEGREE
ASC033	MOST RECENT MAIN TEACHING ASSIGNMENT
ASC053	HOW LONG PLAN REMAIN A PRINCIPAL
ASC067	TEACHER ABSENTEEISM
ASC068	STUDENT TARDINESS
ASC069	STUDENT ABSENTEEISM
ASC070	STUDENTS CUTTING CLASS
ASC071	STUDENTS DROPPING OUT
ASC072	STUDENT APATHY
ASC073	PHYSICAL CONFLICTS AMONG STDNTS
ASC074	ROBBERY OR THEFT
ASC075	VANDALISM OF SCHOOL PROPERTY
ASC076	STUDENT PREGNANCY
ASC077	STUDENT USE OF ALCOHOL
ASC078	STUDENT DRUG ABUSE
ASC079	STUDENT POSSESSION OF WEAPONS
ASC080	STUDENT DISRESPECT OF TEACHERS
ASC081	PHYSICAL ABUSE OF TEACHERS
ASC082	VERBAL ABUSE OF TEACHERS
ASC083	LACK OF ACADEMIC CHALLENGE
ASC084	LACK OF PARENT INVOLVEMENT
ASC085	PARENT ALCOHOL &/OR DRUG ABUSE
ASC086	POVERTY
ASC087	RACIAL TENSION
ASC088	CULTURAL CONFLICT
ASC121	MALE OR FEMALE
ASC122	RACE
ASC123	ENROLLED IN A RECOGNIZED TRIBE

Variables Used for Estimating Averages:

Name	Label
ASC030	NMBR YEARS TEACHING EXPERIENCE BEFORE BEING PRINCIPAL
ASC031	NMBR YEARS TEACHING EXPERIENCE SINCE BECOMING PRINCIPAL

ASC044	NMBR OF YEARS EMPLOYED PRIOR TO THIS YEAR THIS SCHOOL
ASC045	NMBR OF YEARS EMPLOYED AS PRINCIPAL IN OTHER SCHOOLS
ASC046	NMBR OF YEARS EMPLOYED OTHER SCHOOL DIST. OR ADMIN.
ASC048	NMBR OF YEARS IN POSITION OUTSIDE ELEM/SECONDARY
ASC054	NMBR OF YEARS BEFORE RETIREMENT AS PRINCIPAL
ASC125R	AGE
ASC030S	NMBR YEARS TEACHING EXPERIENCE
ASC040S	NMBR YEARS EMPLOYED IN SCHOOLS
ASC030A	NMBR YEARS TEACHING EXP BEFORE BEING PRINCIPAL
ASC031A	NMBR YEARS TEACHING EXP SINCE BECOMING PRINCIPAL
ASC044A	NMBR OF YEARS EMP PRIOR TO THIS YEAR THIS SCHOOL
ASC045A	NMBR OF YEARS EMPLOYED AS PRINCIPAL IN OTHER SCHOOLS
ASC046A	NMBR OF YEARS EMPLOYED OTHER SCHOOL DIST. OR ADMIN.
ASC048A	NMBR OF YEARS IN POSITION OUTSIDE ELEM/SECONDARY
ASC054A	NMBR OF YEARS BEFORE RETIREMENT AS PRINCIPAL
ASC125RA	AGE
ASC030SA	NMBR YEARS TEACHING EXPERIENCE
ASC040SA	NMBR YEARS EMPLOYED IN SCHOOLS

Variables Used for Estimating Proportions:

Name	Label
ASC012	HOLDING BS. DEGREE
ASC015	SECOND MAJOR FIELD OF STUDY
ASC041	PARTICIPATE IN TRAINING FOR ASPIRING SCHOOL ADMINISTRATORS
ASC042	PARTICIPATE IN TRAINING FOR INDIAN EDUCATION ADMINISTRATION
ASC043	COMPLETE THE PROGRAM
ASC118	EXCELLENT TEACHING STAFF
ASC119	EXCELLENT EXPERIENCED TEACHERS
ASC120	EXCELLENT NEW TEACHERS
ASC123	ENROLLED IN RECOGNIZED TRIBE
ASC124	HISPANIC ORIGIN

APPENDIX II

AVERAGE DESIGN EFFECTS TABLES

THE SCHOOL SURVEY

DESIGN EFFECTS

THE SCHOOL SURVEY
DESIGN EFFECTS

	Design Effect				
Group	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
SECTOR					
Public	1.7861	1.4805	1.5805	1.4122	1.7433
Private	1.1148	1.2727	1.1754	1.1871	2.0488
REGION					
Northeast (Public and Private)	1.3104	1.9332	1.2902	1.2139	1.5579
Midwest (Public and Private)	1.3307	1.9984	1.3051	1.2352	1.9952
South (Public and Private)	1.2803	1.7931	1.1749	1.1166	1.6965
West (Public and Private)	1.7811	2.2505	1.8160	1.6666	2.1664
STATE / SCHOOL LEVEL					
Alabama / Elementary (Public)	1.5691	1.0719	1.0596	0.9241	1.0942
Alabama / Secondary (Public)	1.4793	1.1053	0.8646	0.8999	1.0915
Alaska / Elementary (Public)	1.6146	1.3824	1.1170	1.0374	1.1646
Alaska / Secondary (Public)	0.6319	1.5824	0.8920	1.1679	1.4293
Arizona / Elementary (Public)	1.1192	1.0428	1.1413	0.9330	1.3622
Arizona / Secondary (Public)	1.3721	1.3007	0.8602	0.8768	1.0046
Arkansas / Elementary[1] (Public)	1.3602	1.0035	1.3507	0.9178	1.0542
Arkansas / Secondary (Public)	1.1910	0.8183	0.6699	0.7470	1.0496
California / Elementary (Public)	1.2164	1.0406	1.3814	0.8654	1.0758
California / Secondary (Public)	1.8143	1.4104	1.3727	1.1744	2.1724
Colorado / Elementary (Public)	1.6277	1.0902	0.9076	0.9157	1.2276

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[1] Removed the following highly skewed variables : NUMBRKG, NUMBR8, NUMBR7.

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Colorado / Secondary (Public)	1.0658	1.2603	0.8398	0.8581	1.2216
Connecticut / Elementary (Public)	1.3631	1.0526	0.9059	0.9220	0.9838
Connecticut / Secondary (Public)	1.5915	1.0666	1.1785	0.8900	1.3762
Delaware / Elementary (Public)	2.7313	1.0463	2.0791	0.9717	1.0548
Delaware / Secondary (Public)	2.3466	1.1542	1.4717	1.1101	1.0387
D.C. / Elementary (Public)	1.6044	1.2176	1.4014	0.7786	1.0325
D.C. / Secondary (Public)	0.9156	1.0508	1.0603	1.0200	1.0488
Florida / Elementary (Public)	2.4153	0.9499	1.1325	0.9105	0.9862
Florida / Secondary (Public)	1.9503	1.4475	1.6467	1.2015	1.4533
Georgia / Elementary (Public)	2.8728	1.2597	1.2173	1.0309	1.3041
Georgia / Secondary (Public)	1.9000	1.2538	1.6868	0.8428	1.0911
Hawaii / Elementary (Public)	1.2436	1.0119	0.9222	0.9271	1.1314
Hawaii / Secondary (Public)	2.0111	1.1970	1.3616	0.7322	1.0366
Idaho / Elementary (Public)	1.4102	1.0742	1.6292	0.9940	1.0936
Idaho / Secondary (Public)	1.0103	1.0876	0.6577	1.0384	1.1260
Illinois / Elementary (Public)	1.2899	1.0655	1.0783	0.8274	1.0705
Illinois / Secondary (Public)	1.3302	1.2479	1.0563	1.2098	1.0665
Indiana / Elementary (Public)	1.9743	1.0839	0.9479	0.9587	1.0183
Indiana / Secondary (Public)	1.3403	1.0380	0.8699	0.9318	1.0741
Iowa / Elementary / (Public)	2.6367	1.4062	2.8641	1.2870	1.5444
Iowa / Secondary (Public)	1.0576	0.9991	0.7832	0.7409	1.4343
Kansas / Elementary (Public)	1.2332	0.9438	0.8194	0.9142	1.0681
Kansas / Secondary (Public)	0.8535	0.8306	0.6322	0.7870	1.0963

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Kentucky / Elementary[1] (Public)	1.2531	0.9881	0.9102	0.7999	1.3961
Kentucky / Secondary (Public)	2.3833	1.2051	0.9566	0.8236	1.0527
Louisiana / Elementary (Public)	1.4695	1.0671	0.9871	0.8701	1.0376
Louisiana / Secondary (Public)	1.7726	1.4243	1.0503	0.9803	1.2558
Maine / Elementary (Public)	1.2519	0.9773	0.9838	0.8845	0.9927
Maine / Secondary (Public)	1.5847	1.0760	1.0155	0.8400	1.3873
Maryland / Elementary (Public)	1.8264	1.0690	0.9459	0.8926	1.0374
Maryland / Secondary (Public)	1.7280	1.1235	0.9478	1.0183	1.1122
Massachusetts / Elementary (Public)	1.5410	0.9807	0.9771	0.9214	1.1481
Massachusetts / Secondary (Public)	2.2777	1.7202	1.1900	1.2524	1.6623
Michigan / Elementary (Public)	1.9264	1.1973	1.3470	1.0984	1.4777
Michigan / Secondary (Public)	1.6295	1.0358	1.0654	0.9621	1.4115
Minnesota / Elementary (Public)	1.2986	0.9936	0.8010	0.9004	1.0369
Minnesota / Secondary (Public)	1.7649	1.1317	1.1332	1.0375	1.1774
Mississippi / Elementary (Public)	1.6109	1.0577	2.0223	0.9942	1.1363
Mississippi / Secondary (Public)	1.6830	0.9607	0.9406	0.8462	0.9518
Missouri / Elementary (Public)	1.4633	1.0572	1.5222	0.9525	1.0121
Missouri / Secondary (Public)	0.8746	0.8571	0.6890	0.8237	1.0569
Montana / Elementary (Public)	1.3182	1.3617	1.7046	0.9901	1.3153
Montana / Secondary (Public)	0.4523	0.7357	0.5357	0.7539	1.3876
Nebraska / Elementary (Public)	0.8335	0.7659	0.6286	0.6856	1.0966

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[1] Removed the following highly skewed variable : BILNGNUM

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Nebraska / Secondary (Public)	0.8107	0.9355	0.5957	0.8586	1.2006
Nevada / Elementary (Public)	1.0956	1.0088	1.3622	0.8317	1.3176
Nevada / Secondary (Public)	0.8932	0.8955	0.7003	0.7904	1.0877
New Hampshire / Elementary (Public)	1.5643	1.3356	1.0332	1.0304	1.1175
New Hampshire / Secondary (Public)	1.2095	1.4954	0.6881	1.0348	1.0654
New Jersey / Elementary (Public)	1.1720	0.9705	0.9001	0.8771	0.8996
New Jersey / Secondary (Public)	1.2391	1.2373	0.9382	0.9352	1.1851
New Mexico / Elementary (Public)	1.0005	0.8273	1.2172	0.7179	1.1429
New Mexico / Secondary (Public)	1.5546	1.3714	1.2572	1.1269	1.4832
New York / Elementary (Public)	1.5402	1.0315	1.1967	0.9696	1.0101
New York / Secondary (Public)	1.6185	1.3296	1.3469	1.1631	1.8886
North Carolina / Elementary (Public)	2.2206	1.0863	1.1357	1.0658	1.0886
North Carolina / Secondary (Public)	1.7852	1.4662	0.9365	1.0493	0.8912
North Dakota / Elementary (Public)	1.2379	0.8979	0.9597	0.7693	1.2447
North Dakota / Secondary (Public)	1.1165	0.7855	0.4248	0.6550	0.8523
Ohio / Elementary (Public)	1.8200	1.0308	1.3754	0.9831	1.0262
Ohio / Secondary (Public)	2.3125	1.0952	1.1501	1.1208	1.3561
Oklahoma / Elementary (Public)	1.7938	1.3464	1.0252	1.0817	1.4210
Oklahoma / Secondary (Public)	1.3903	1.2635	0.9873	1.0579	1.4931
Oregon / Elementary (Public)	1.3553	1.0780	0.9982	0.8524	1.3167
Oregon / Secondary (Public)	1.2697	1.2095	0.6762	0.8843	1.1063
Pennsylvania / Elementary (Public)	1.4908	1.0556	1.1427	0.8842	1.0763
Pennsylvania / Secondary (Public)	1.6663	1.2692	1.2357	1.1043	1.0028

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Rhode Island / Elementary (Public)	1.7113	0.9567	1.7881	0.8611	0.9530
Rhode Island / Secondary (Public)	2.0006	1.2285	1.0181	0.9658	1.0805
South Carolina / Elementary (Public)	1.5334	1.1226	1.1566	0.9261	1.0810
South Carolina / Secondary (Public)	1.3996	1.3607	0.9849	0.8146	0.8817
South Dakota / Elementary (Public)	2.7334	0.9508	1.2762	0.8819	1.4070
South Dakota / Secondary (Public)	0.7680	0.8178	0.3672	0.6742	1.0640
Tennessee / Elementary (Public)	1.4221	1.1200	0.9617	0.9366	1.0535
Tennessee / Secondary (Public)	2.8862	1.1233	0.9498	1.0157	1.0385
Texas / Elementary (Public)	1.6638	1.0658	1.1158	0.9237	1.1468
Texas / Secondary (Public)	1.3849	1.1840	0.9636	0.9553	1.1404
Utah / Elementary (Public)	1.2525	1.0772	0.9834	0.9923	0.9738
Utah / Secondary (Public)	1.7621	1.3234	1.4076	1.1298	2.0832
Vermont / Elementary (Public)	1.2478	0.9373	0.7714	0.7426	1.0485
Vermont / Secondary (Public)	1.0248	0.9744	1.1807	0.9182	1.1180
Virginia / Elementary (Public)	1.7591	1.0423	1.1613	0.9022	1.2648
Virginia / Secondary (Public)	1.3476	1.0888	0.9093	0.8498	0.7372
Washington / Elementary (Public)	1.5103	1.0178	1.0874	0.9496	1.2189
Washington / Secondary (Public)	1.5522	1.1699	1.0518	1.0561	1.4428
West Virginia / Elementary (Public)	1.3367	1.1888	0.8417	1.0299	1.1545
West Virginia / Secondary[1] (Public)	1.5215	1.4537	1.2777	1.1328	1.3274
Wisconsin / Elementary (Public)	1.7059	1.0699	1.2388	0.9146	0.9411

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[1] Removed the following highly skewed variables : BILNGNUM, AFTERNUM

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Wisconsin / Secondary (Public)	1.1053	0.9017	0.8628	0.7931	1.0160
Wyoming / Elementary (Public)	1.2780	1.1672	1.4113	1.0062	1.1297
Wyoming / Secondary (Public)	1.0744	1.1112	0.9186	0.9333	1.0786
SECTOR / REGION					
Public / Northeast	1.7107	1.8303	1.3397	1.1967	1.3891
Public / Midwest	1.4753	1.8727	1.2119	1.1434	1.7425
Public / South	1.6107	1.3381	1.2002	1.1015	1.6310
Public / West	2.1436	2.3708	1.9957	1.7972	2.5875
Private / Northeast	1.1858	2.3585	1.1733	1.1720	1.9782
Private / Midwest	1.5828	2.6679	1.7525	1.3167	3.1342
Private / South	1.1202	2.2216	0.9983	1.1309	1.7928
Private / West	1.6476	1.9302	1.5050	1.2565	1.8330
SECTOR / COMMUNITY TYPE[1] / MINORITY STATUS					
Public / Urban / Less than 20%	3.5063	2.6017	1.3547	1.3626	1.9999
Public / Urban / 20% or greater	2.0679	1.6152	1.4841	1.3442	1.8961
Public/ Suburban / Less than 20%	2.7578	1.5486	1.5183	1.0135	1.5545
Public / Suburban / 20% or greater	2.3900	1.9485	1.3686	1.1524	1.6531
Public / Rural / Less than 20%	1.7438	1.5160	1.4307	1.2785	1.8917
Public/ Rural / 20% or greater	2.6474	2.0388	1.6472	1.6934	1.8891
Private/ Urban / Less than 20%	1.8099	1.4929	1.1468	1.1878	1.9763
Private/ Urban / 20% or greater	1.9248	1.5075	1.2478	1.1607	1.5967

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[1] **Community type categories of Urban, Suburban, Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).**

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Private/ Suburban / Less than 20%	1.4189	1.3006	1.2592	1.0706	1.5529
Private/ Suburban / 20% or greater	2.1681	1.5391	1.2438	1.1641	1.9075
Private / Rural / Less than 20%	1.6645	1.6493	1.2404	1.1472	2.4138
Private/ Rural / 20% or greater	2.3579	1.7336	2.0866	1.4460	1.9902
SECTOR / SCHOOL LEVEL					
Public / Elementary	1.7800	1.8068	1.2774	1.2016	1.5523
Public / Secondary	2.0316	2.0097	1.6090	1.3486	1.9849
Public / Combined	2.2548	3.0613	1.1720	1.7475	1.5374
Private / Elementary	1.5913	2.2941	1.4631	1.3322	1.8584
Private / Secondary	1.4531	2.5122	1.1591	1.5171	1.6147
Private / Combined	1.2845	2.0608	1.1295	1.2203	2.2989
SECTOR / COMMUNITY TYPE[1]					
Public / Urban	2.2406	1.6395	1.4522	1.2917	1.8872
Public / Suburban	2.1143	1.5156	1.6053	1.0953	1.5060
Public / Rural	1.8167	1.4925	1.6410	1.3575	1.9461
Private / Urban	1.3780	1.3840	1.3194	1.2513	1.8475
Private / Suburban	1.5163	1.2303	1.1027	1.0514	1.8374
Private / Rural	2.2902	1.7429	1.3848	1.2987	2.3899
TYPOLOGY					
Catholic (Parochial)	2.0634	1.9035	1.2553	0.9233	1.1058

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[1] **Community type categories of Urban, Suburban, Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).**

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Catholic (Diocesan)	1.5986	2.6165	0.8250	0.8775	1.2244
Catholic (Private)	2.3377	2.2266	1.0213	1.0536	1.5937
Other (Conservative Christian)	1.5532	2.4285	1.2093	1.2120	1.8052
Other (Affiliated)	1.9702	2.6384	1.7065	1.3909	2.1321
Other (Unaffiliated)	0.9154	2.9237	1.0508	1.0973	2.3382
Non-Sectarian (Regular)	1.6218	2.5624	1.1217	1.1675	1.7478
Non-Sectarian (Special Emphasis)	2.3466	3.7815	1.5812	1.3505	2.4964
Non-Sectarian (Special Education)	3.8274	3.2432	1.5838	1.6651	2.2393
SECTOR / COMMUNITY TYPE[1] / SCHOOL SIZE					
Public / Urban / 1-149	6.4386	2.9283	2.2863	1.9885	3.0787
Public / Urban / 150-499	4.2128	2.0979	1.5599	1.2777	1.6585
Public / Urban / 500-749	7.3773	4.6415	1.6225	1.3507	1.7013
Public / Urban / 750+	5.2631	2.7311	1.5506	1.5261	2.1099
Public / Suburban / 1-149	3.8182	2.3687	1.7158	1.8150	2.6506
Public / Suburban / 150-499	4.1234	2.5588	1.6018	1.1452	1.4328
Public / Suburban / 500-749	6.9753	2.7248	1.7374	1.3989	1.5060
Public / Suburban / 750+	6.0889	2.7918	1.6810	1.5861	2.0202
Public / Rural / 1-149	3.4919	1.9537	2.1920	1.4170	2.1640
Public / Rural / 150-499	3.8471	2.4980	1.4866	1.6272	1.7012
Public / Rural / 500-749	5.3842	3.7139	1.5789	1.5573	1.6952
Public / Rural / 750+	6.3423	3.5859	1.5444	1.4978	1.7804

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[1] Community type categories of Urban, Suburban, Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Private / Urban / 1-149	2.5682	1.9522	2.0103	1.6525	2.2639
Private / Urban / 150-499	3.3371	1.8321	1.4240	1.1790	1.3337
Private / Urban / 500-749	8.1987	1.9661	1.5551	1.2142	1.5892
Private / Urban / 750+	6.9431	1.9703	0.9989	1.1401	1.2117
Private / Suburban / 1-149	2.5040	1.7628	1.3298	1.2790	2.1220
Private / Suburban / 150-499	4.2744	1.8397	1.2481	0.9388	1.2891
Private / Suburban / 500-749	7.2049	2.3394	1.3340	1.1689	1.3765
Private / Suburban / 750+	7.8753	2.1312	1.3996	1.1718	1.3334
Private / Rural / 1-149	3.4485	1.8923	1.9407	1.4594	2.4127
Private / Rural / 150-499	5.2813	1.6156	1.1615	1.0311	1.3775
Private / Rural / 500-749	8.5532	3.4577	2.0839	1.4709	1.7421
Private / Rural / 750+	6.0391	5.4295	4.2800	2.9651	3.2628
STATE					
Alabama (Public)	1.6443	1.1602	1.3617	1.0221	1.5306
Alaska (Public)	0.8336	0.9958	0.6339	0.9187	1.1710
Arizona (Public)	1.2496	1.0281	1.0644	0.9126	1.6290
Arkansas (Public)	3.7940	0.8365	0.9930	0.7624	1.0730
California (Public)	1.1572	1.0580	1.0046	0.9315	1.5186
Colorado (Public)	1.2651	1.0439	1.0840	0.9395	1.4125
Connecticut (Public)	1.4476	0.9737	1.0332	0.8429	1.1847
Delaware (Public)	1.6235	0.9977	1.4064	0.9570	1.0523
D.C. (Public)	0.9564	1.0625	0.7324	0.8184	0.9180
Florida (Public)	1.3034	0.9569	1.1041	0.8975	1.1199

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
Georgia (Public)	2.7002	1.4690	2.0120	0.7867	1.5319
Hawaii (Public)	0.8970	0.7365	0.5539	0.7113	0.9207
Idaho (Public)	1.0165	0.9370	1.0425	0.8498	1.0206
Illinois (Public)	1.2065	1.1254	1.0070	0.9288	1.5767
Indiana (Public)	1.5541	0.9955	1.2642	0.8618	1.2712
Iowa (Public)	2.0092	1.2926	1.2984	1.1931	1.6461
Kansas (Public)	1.0262	0.9262	0.8375	0.8225	1.1807
Kentucky (Public)	1.3985	1.1119	1.1668	0.9768	1.4978
Louisiana (Public)	1.3093	1.0652	1.1389	0.8440	1.2554
Maine (Public)	1.1923	0.8914	1.0344	0.7911	1.2027
Maryland (Public)	1.6520	1.1542	1.6836	0.8790	1.3359
Massachusetts (Public)	1.6236	1.0728	1.1090	0.9600	1.6277
Michigan (Public)	1.7069	1.1361	1.2752	1.0330	1.8683
Minnesota (Public)	1.2909	1.0009	0.9467	0.8913	1.1225
Mississippi (Public)	1.5528	0.9717	1.1991	0.9309	1.1081
Missouri (Public)	1.1135	0.8888	1.0232	0.8199	1.0841
Montana (Public)	0.8502	1.0245	0.8963	0.8365	1.6299
Nebraska (Public)	0.6565	0.7745	0.8989	0.6741	1.3587
Nevada (Public)	0.8756	0.8853	0.8357	0.7318	1.2831
New Hampshire (Public)	1.1062	0.8795	0.9149	0.7692	1.1256
New Jersey (Public)	1.1312	0.8744	0.8612	0.7742	1.1243
New Mexico (Public)	0.9712	0.9058	0.7820	0.7167	1.3404
New York (Public)	1.6395	1.1343	1.1973	1.0913	1.3551

THE SCHOOL SURVEY
DESIGN EFFECTS

Group	Design Effect				
	Student Total	Teacher Total	Student Average	Teacher Average	School Proportion
North Carolina (Public)	1.8655	1.0715	1.2795	1.0097	1.1817
North Dakota (Public)	0.9674	0.7947	0.8941	0.6728	1.1993
Ohio (Public)	1.7186	1.0631	1.5669	0.9687	1.3108
Oklahoma (Public)	1.5754	1.2837	1.2190	1.0735	1.3214
Oregon (Public)	1.2165	1.0320	1.0102	0.8195	1.6697
Pennsylvania (Public)	1.2901	0.9685	1.2419	0.8178	1.2567
Rhode Island (Public)	1.5032	0.7353	1.0326	0.7428	0.9809
South Carolina (Public)	1.2804	1.0181	1.5050	0.8217	1.0969
South Dakota (Public)	1.5171	0.9690	1.2246	0.8755	1.6194
Tennessee (Public)	1.6509	1.0691	1.5143	0.8415	1.2575
Texas (Public)	1.4011	1.0217	0.9875	0.9448	1.2539
Utah (Public)	1.2124	0.8412	1.1587	0.7626	1.2747
Vermont (Public)	1.1145	0.7852	0.7178	0.6750	1.0579
Virginia (Public)	1.5106	0.8464	1.3021	0.6954	1.3900
Washington (Public)	1.5667	0.9734	1.0498	0.8848	1.3688
West Virginia (Public)	1.3488	1.1853	1.2954	0.9065	1.3774
Wisconsin (Public)	1.3784	0.8935	1.2515	0.8066	1.1058
Wyoming (Public)	0.9528	0.9485	0.9450	0.8434	1.2116

THE SCHOOL ADMINISTRATOR SURVEY

DESIGN EFFECTS

THE SCHOOL ADMINISTRATOR SURVEY
DESIGN EFFECTS

Group	Design Effect		
	Total	Average[1]	Proportion
SECTOR			
Public	1.7674	9.6513	1.7807
Private	1.9463	7.7430	2.3694
REGION			
Northeast (Public and Private)	1.7313	12.6133	2.1596
Midwest (Public and Private)	1.6179	8.1035	2.6416
South (Public and Private)	1.4675	5.8482	1.6131
West (Public and Private)	1.9653	8.9257	2.5425
STATE			
Alabama (Public)	1.1907	10.8793	1.1647
Alaska (Public)	1.4914	4.6279	1.0623
Arizona (Public)	1.2219	4.5244	1.3579
Arkansas (Public)	0.9668	9.8771	0.9433
California (Public)	1.1174	8.1999	1.4848
Colorado (Public)	1.2626	7.7793	1.5133
Connecticut (Public)	1.0473	9.6488	1.2428
Delaware (Public)	0.9498	5.5027	1.1811
D.C. (Public)	1.0127	4.4429	0.9855
Florida (Public)	1.0422	8.0281	1.0115
Georgia (Public)	2.5268	5.5121	1.4094
Hawaii (Public)	0.8943	14.8943	0.9489

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[1] The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.

THE SCHOOL ADMINISTRATOR SURVEY
DESIGN EFFECTS

Group	Design Effect		
	Total	Average[1]	Proportion
Idaho (Public)	1.4794	3.7361	0.9886
Illinois (Public)	2.2878	8.1050	1.6533
Indiana (Public)	1.8815	6.1983	1.3574
Iowa (Public)	1.6554	8.6623	1.1598
Kansas (Public)	0.9219	15.6790	0.9398
Kentucky (Public)	1.3710	5.8147	1.3920
Louisiana (Public)	1.1025	7.7442	1.1771
Maine (Public)	1.2362	17.4688	1.4042
Maryland (Public)	2.7830	6.4169	1.0403
Massachusetts (Public)	1.2550	13.3996	1.3348
Michigan (Public)	2.0659	11.2003	1.6869
Minnesota (Public)	1.8597	13.9715	1.3689
Mississippi (Public)	1.0376	7.8092	1.2920
Missouri (Public)	1.2767	9.2680	1.1753
Montana (Public)	1.5859	6.4568	1.2625
Nebraska (Public)	1.6145	8.4423	2.2858
Nevada (Public)	0.9379	5.4072	1.1555
New Hampshire (Public)	1.0036	8.4797	1.1231
New Jersey (Public)	1.0829	8.8347	1.5416
New Mexico (Public)	1.3093	5.0790	1.2307
New York (Public)	1.2494	18.5396	1.2920
North Carolina (Public)	1.0754	9.3135	1.2738

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[1] **The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.**

THE SCHOOL ADMINISTRATOR SURVEY
DESIGN EFFECTS

Group	Design Effect		
	Total	Average[1]	Proportion
North Dakota (Public)	1.0367	6.8701	1.0710
Ohio (Public)	2.1910	8.5987	1.6875
Oklahoma (Public)	1.2424	6.9101	1.6453
Oregon (Public)	1.3918	5.1617	1.5334
Pennsylvania (Public)	1.2307	19.7196	1.5908
Rhode Island (Public)	0.9060	5.7717	1.2550
South Carolina (Public)	1.2190	9.7674	1.2549
South Dakota (Public)	2.0746	16.3175	1.3217
Tennessee (Public)	1.5919	13.1868	1.4948
Texas (Public)	1.3466	4.9614	1.2064
Utah (Public)	1.1025	3.6325	1.0851
Vermont (Public)	1.1903	4.0842	1.0712
Virginia (Public)	1.2157	15.6062	1.8616
Washington (Public)	1.0687	6.1613	1.2163
West Virginia[2] (Public)	1.1389	18.2969	1.2916
Wisconsin (Public)	1.5404	8.2788	1.1753
Wyoming (Public)	1.0893	4.8190	0.9912
SECTOR / REGION			
Public / Northeast	1.5929	14.2514	1.8826
Public / Midwest	1.5921	8.2160	1.6696
Public / South	1.6045	7.3663	1.3780
Public / West	1.9977	12.0841	2.3919

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[1] The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.

[2] Removed the following highly skewed variable : ASC017

THE SCHOOL ADMINISTRATOR SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total	Average[1]	Proportion
Private / Northeast	1.6588	9.4465	2.0898
Private / Midwest	2.3380	13.3192	3.0991
Private / South	1.4209	4.6484	1.8431
Private / West	1.9381	4.0911	2.2483
SECTOR / SCHOOL LEVEL			
Public / Elementary	1.5802	8.7312	1.4648
Public / Secondary	2.3787	8.0225	1.6533
Public / Combined	3.0286	6.6091	1.6017
Private / Elementary	1.4408	13.7600	2.1853
Private / Secondary	2.5488	3.7589	1.2532
Private / Combined	1.7580	6.5463	1.7633
STATE / SCHOOL LEVEL			
Alabama / Elementary (Public)	1.0581	6.7236	0.8895
Alabama / Secondary (Public)	1.1780	18.9657	1.0536
Alaska / Elementary (Public)	1.1590	2.8994	0.9782
Alaska / Secondary (Public)	3.4530	1.9223	1.2839
Arizona / Elementary (Public)	1.1490	4.1637	0.9621
Arizona / Secondary (Public)	1.1209	3.8420	1.1092
Arkansas / Elementary (Public)	0.9818	18.2667	0.9650
Arkansas / Secondary (Public)	1.0779	4.4175	0.9482
California / Elementary (Public)	0.9603	6.8224	1.0510

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[1] The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.

THE SCHOOL ADMINISTRATOR SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total	Average[1]	Proportion
California / Secondary (Public)	1.5729	6.9273	1.6125
Colorado / Elementary (Public)	1.4436	7.8686	1.2388
Colorado / Secondary (Public)	1.9375	3.5981	1.1968
Connecticut / Elementary (Public)	1.1215	7.2962	0.9890
Connecticut / Secondary (Public)	1.2652	8.4883	1.1440
Delaware / Elementary (Public)	0.9801	13.1612	0.9997
Delaware / Secondary (Public)	1.1425	4.0742	1.6070
D.C. / Elementary (Public)	1.0546	5.0568	0.9579
D.C. / Secondary (Public)	1.1394	3.0720	1.1417
Florida / Elementary (Public)	1.0219	7.3276	0.9702
Florida / Secondary (Public)	1.3474	22.8080	1.6207
Georgia / Elementary (Public)	1.2028	4.5524	1.1807
Georgia / Secondary (Public)	1.3841	9.8123	1.0972
Hawaii / Elementary (Public)	0.8410	10.2159	0.9186
Hawaii / Secondary (Public)	1.1457	2.1852	1.0287
Idaho / Elementary (Public)	1.7638	7.3063	0.7031
Idaho / Secondary (Public)	1.3683	3.8577	1.0474
Illinois / Elementary (Public)	1.0347	8.0082	1.0853
Illinois / Secondary (Public)	4.3296	6.2369	1.4929
Indiana / Elementary (Public)	1.1118	7.5764	1.0236
Indiana / Secondary (Public)	1.4124	8.0302	1.0866
Iowa / Elementary (Public)	2.2662	4.6237	1.2366

[1] The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.

[2] Removed the following highly skewed variable : ASC017

THE SCHOOL ADMINISTRATOR SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total	Average[1]	Proportion
Iowa / Secondary (Public)	1.9597	31.5073	1.1513
Kansas / Elementary (Public)	1.1376	16.2143	0.9522
Kansas / Secondary (Public)	1.1241	20.3080	1.1385
Kentucky / Elementary (Public)	1.3027	4.9868	1.1121
Kentucky / Secondary (Public)	1.1530	4.9613	1.2783
Louisiana / Elementary (Public)	1.0274	5.8785	1.1870
Louisiana / Secondary (Public)	1.0911	12.2297	1.0304
Maine / Elementary (Public)	1.3108	25.1229	1.2953
Maine / Secondary (Public)	1.8631	13.0161	0.9974
Maryland / Elementary (Public)	1.2145	4.8791	0.9644
Maryland / Secondary (Public)	1.4849	12.8977	0.8464
Massachusetts / Elementary (Public)	1.2422	11.9124	0.8387
Massachusetts / Secondary (Public)	1.8362	6.7792	1.2805
Michigan / Elementary[2] (Public)	1.3771	6.5031	1.1664
Michigan / Secondary (Public)	1.8660	40.5944	1.5564
Minnesota / Elementary (Public)	0.9526	31.9417	1.2472
Minnesota / Secondary (Public)	1.5220	10.1645	1.0170
Mississippi / Elementary (Public)	1.0389	15.1835	1.2057
Mississippi / Secondary (Public)	1.4089	2.9830	1.1251
Missouri / Elementary (Public)	1.5047	15.1622	1.0253
Missouri / Secondary (Public)	1.1477	5.4576	1.0469
Montana / Elementary (Public)	1.4219	6.8903	0.8840

[1] The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.

[2] Removed the following highly skewed variable : ASC017

THE SCHOOL ADMINISTRATOR SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total	Average[1]	Proportion
Montana / Secondary (Public)	1.5220	3.7833	1.4651
Nebraska / Elementary (Public)	1.8773	8.4114	1.8109
Nebraska / Secondary (Public)	1.4242	3.4372	1.1667
Nevada / Elementary (Public)	1.0242	6.1463	1.1139
Nevada / Secondary (Public)	1.0160	5.6658	1.3227
New Hampshire / Elementary (Public)	1.4295	13.5446	1.0682
New Hampshire / Secondary (Public)	1.7949	4.4577	1.1483
New Jersey / Elementary (Public)	1.0101	9.9683	1.1370
New Jersey / Secondary (Public)	1.4775	9.9935	0.8985
New Mexico / Elementary (Public)	1.3419	6.7986	1.0737
New Mexico / Secondary (Public)	1.2839	5.8626	1.2778
New York / Elementary (Public)	1.1509	18.3850	0.8409
New York / Secondary (Public)	1.5635	8.7956	1.1406
North Carolina / Elementary (Public)	1.2935	8.7177	0.9883
North Carolina / Secondary (Public)	1.4070	12.1036	0.7570
North Dakota / Elementary (Public)	1.0433	6.5702	1.0281
North Dakota / Secondary (Public)	1.1055	12.6595	0.9039
Ohio / Elementary (Public)	1.0491	6.5306	1.1567
Ohio / Secondary (Public)	1.3338	9.9831	1.3088
Oklahoma / Elementary (Public)	1.4770	6.8946	1.6353
Oklahoma / Secondary (Public)	1.4599	6.9870	1.2324
Oregon / Elementary (Public)	1.2329	5.6228	1.1785

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[1] The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.

The School Administrator Survey
DESIGN EFFECTS

	Design Effect		
Group	Total	Average[1]	Proportion
Oregon / Secondary (Public)	2.0332	3.3570	1.0549
Pennsylvania / Elementary (Public)	1.3540	15.3781	1.2087
Pennsylvania / Secondary (Public)	1.3808	11.6249	1.3606
Rhode Island / Elementary (Public)	1.0490	5.7975	1.2664
Rhode Island / Secondary (Public)	1.0115	4.8488	1.1526
South Carolina / Elementary (Public)	1.1599	9.1567	1.0408
South Carolina / Secondary (Public)	1.1546	3.7180	1.2400
South Dakota / Elementary (Public)	1.5555	14.7680	1.1976
South Dakota / Secondary (Public)	1.6641	8.9829	1.1466
Tennessee / Elementary (Public)	1.2095	13.6957	1.0855
Tennessee / Secondary (Public)	1.2386	9.6022	1.1455
Texas / Elementary (Public)	1.0954	4.7645	1.0594
Texas / Secondary (Public)	1.8988	5.2898	1.1603
Utah / Elementary (Public)	0.7868	3.3606	0.9295
Utah / Secondary (Public)	1.9229	4.3460	1.1503
Vermont / Elementary (Public)	1.2288	5.4157	1.1966
Vermont / Secondary (Public)	1.3218	3.6492	1.0696
Virginia / Elementary (Public)	1.1035	15.4597	1.4570
Virginia / Secondary (Public)	1.0927	13.3838	1.1355
Washington / Elementary (Public)	1.0761	6.0695	1.2417
Washington / Secondary (Public)	1.2107	4.6232	1.1456
West Virginia / Elementary (Public)	1.1762	16.7715	1.1220

[1] The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.

THE SCHOOL ADMINISTRATOR SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total	Average[1]	Proportion
West Virginia / Secondary (Public)	2.9929	13.0403	1.1825
Wisconsin / Elementary (Public)	1.6732	14.3604	0.9760
Wisconsin / Secondary (Public)	1.7376	8.2227	1.1423
Wyoming / Elementary (Public)	1.2686	5.3764	0.9011
Wyoming / Secondary (Public)	1.9969	10.7972	1.0810
TYPOLOGY			
Catholic (Parochial)	0.9541	8.8596	1.0984
Catholic (Diocesan)	1.3916	8.1631	0.9574
Catholic (Private Order)	2.1496	3.0915	1.3087
Other (Conservative Christian)	1.6937	5.5271	1.6923
Other (Affiliated)	2.3462	13.9242	2.3992
Other (Unaffiliated)	2.4140	6.8356	2.7643
Non-Sectarian (Regular)	2.8664	4.8762	1.9791
Non-Sectarian (Special Emphasis)	2.4374	6.4390	1.6907
Non-Sectarian (Special Education)	2.8574	5.5779	2.4102

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[1] **The relatively high average design effect is attributable to three highly skewed variables: (ASC031, ASC047, ASC048). Removal of these variables will produce an average design effect similar to that of School Survey Averages.**

THE TDS SURVEY

DESIGN EFFECTS (PRIVATE SCHOOLS)

THE TDS SURVEY
DESIGN EFFECTS (PRIVATE SCHOOLS)

	Design Effect		
Group	Total	Average	Proportion
SECTOR			
Private	1.2311	1.2684	2.0494
REGION			
Northeast	1.0202	1.1914	1.5659
Midwest	1.0975	1.4897	2.4695
South	1.1115	1.1815	1.7345
West	1.5787	1.4962	2.1340
TYPOLOGY			
Catholic (Parochial)	1.2967	0.8813	0.7665
Catholic (Diocesan)	1.3284	0.8862	0.9189
Catholic (Private)	1.3921	0.9803	0.5556
Other (Conservative Christian)	1.5257	1.2186	2.9864
Other (Affiliated)	1.5167	1.5497	2.3856
Other (Unaffiliated)	0.9568	1.1344	1.4068
Non-Sectarian (Special Regular)	1.0313	0.8852	2.0943
Non-Sectarian (Special Emphasis)	1.8594	1.6474	1.0783
Non-Sectarian (Special Education)	1.5254	1.3463	1.4866
SCHOOL LEVEL			
Elementary	1.2827	1.1430	1.2096
Secondary	2.4151	2.1916	0.9467
Combined	1.0842	1.0557	3.7964

THE TDS SURVEY
DESIGN EFFECTS (PRIVATE SCHOOLS)

	Design Effect		
Group	**Total**	**Average**	**Proportion**
MINORITY STATUS			
Less than 20%	1.1533	1.0118	1.9988
20% or greater	1.5813	1.5169	1.6276

THE TEACHER SURVEY

DESIGN EFFECTS

THE TEACHER SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total[1]	Average	Proportion
SECTOR			
Public	4.9558	3.4517	2.8493
Private	3.3217	2.3368	1.9053
REGION			
Northeast (Public & Private)	3.8797	2.7311	2.3810
Midwest (Public & Private)	4.0304	3.0091	2.6248
South (Public & Private)	4.0223	2.6715	2.3030
West (Public & Private)	8.3177	5.0727	4.4739
STATE			
Alabama (Public)	3.0477	1.7485	1.8263
Alaska (Public)	2.5128	2.2510	1.2657
Arizona (Public)	2.9677	1.5836	1.5592
Arkansas (Public)	1.7556	1.8011	1.3032
California (Public)	5.2026	3.4983	2.4598
Colorado (Public)	3.0588	2.0269	1.7187
Connecticut (Public)	2.2570	1.4681	1.1969
Delaware (Public)	4.9934	1.9385	1.1283
D.C. (Public)	2.9786	1.7946	0.9846
Florida (Public)	3.5757	2.0889	1.7254
Georgia (Public)	2.7375	1.8067	1.7438
Hawaii (Public)	2.9077	1.9855	1.1357

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[1] A highly skewed variable (RACE=WHITE) caused high average design effects. Removal of this variable produced an average design effect similar to that of School Survey Averages.

THE TEACHER SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total[1]	Average	Proportion
Idaho (Public)	2.7167	1.6024	1.3720
Illinois (Public)	4.1780	2.1729	2.2999
Indiana (Public)	2.1515	1.5477	1.5178
Iowa (Public)	4.8581	1.9674	2.1445
Kansas (Public)	2.8384	1.6587	1.5411
Kentucky (Public)	3.4417	1.8278	1.9487
Louisiana (Public)	2.5132	1.9465	1.6405
Maine (Public)	3.0888	1.4614	1.3592
Maryland (Public)	3.0325	1.8721	1.6118
Massachusetts (Public)	3.5505	2.1051	2.0446
Michigan (Public)	3.2165	2.4568	1.6288
Minnesota (Public)	3.8649	2.0503	1.8020
Mississippi (Public)	3.7714	2.6471	1.4765
Missouri (Public)	3.1963	2.4129	2.1393
Montana (Public)	4.9286	2.8173	2.2190
Nebraska (Public)	3.6021	1.3768	1.5922
Nevada (Public)	2.1019	1.7895	1.2476
New Hampshire (Public)	3.0917	1.9772	1.1774
New Jersey (Public)	2.9946	1.8308	1.5315
New Mexico (Public)	3.6395	1.5731	1.4599
New York (Public)	3.5146	2.6663	2.0491
North Carolina (Public)	2.3448	1.9263	1.7386

[1] A highly skewed variable (RACE=WHITE) caused high average design effects. Removal of this variable produced an average design effect similar to that of School Survey Averages.

THE TEACHER SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total[1]	Average	Proportion
North Dakota (Public)	4.8241	1.9025	1.6409
Ohio (Public)	3.0222	2.2062	1.6973
Oklahoma (Public)	5.5219	2.6088	2.3292
Oregon (Public)	2.9702	1.6834	1.7246
Pennsylvania (Public)	2.3952	2.0967	1.3684
Rhode Island (Public)	2.1139	1.6850	1.4385
South Carolina (Public)	2.8793	2.2419	1.6756
South Dakota (Public)	8.5746	3.0681	1.8826
Tennessee (Public)	3.4019	1.9162	1.7288
Texas (Public)	3.4528	2.3248	1.8895
Utah (Public)	3.4124	2.1407	1.3722
Vermont (Public)	6.1806	2.3882	1.0946
Virginia (Public)	2.8297	1.9860	1.6555
Washington (Public)	2.7054	1.7643	1.6668
West Virginia (Public)	3.1728	2.0520	1.5631
Wisconsin (Public)	3.4119	2.1965	1.7568
Wyoming (Public)	4.1939	1.4228	1.6890
SECTOR / REGION			
Public / Northeast	3.9704	2.7906	2.5645
Public / Midwest	4.0576	2.9278	2.6887
Public / South	3.8873	2.7268	2.3801

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[1] A highly skewed variable (RACE=WHITE) caused high average design effects. Removal of this variable produced an average design effect similar to that of School Survey Averages.

THE TEACHER SURVEY
DESIGN EFFECTS

	Design Effect		
Group	Total[1]	Average	Proportion
Public / West	9.1142	5.2303	5.1345
Private / Northeast	2.6959	2.0316	1.6961
Private / Midwest	3.4513	2.4097	2.1055
Private / South	3.8505	2.0325	1.6537
Private / West	3.3266	2.4737	1.7067
SECTOR / MINORITY STATUS			
Public / Less than 20%	6.5288	4.6752	2.5893
Public / 20% or greater	7.2184	5.4339	3.3938
Private / Less than 20%	3.8217	5.6237	1.7785
Private / 20% or greater	4.5314	4.4537	1.9559

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[1] A highly skewed variable (RACE=WHITE) caused high average design effects. Removal of this variable produced an average design effect similar to that of School Survey Averages.

APPENDIX III

GENERALIZED VARIANCE FUNCTION TABLES

THE SCHOOL SURVEY

GVFs FOR SCHOOL PROPORTIONS

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Public	-1.797043427	1.824566931	1.7433	0.9746
Private	-7.001834861	7.030780094	2.0488	0.9771
REGION				
Northeast	-7.394921272	7.459262802	1.5579	0.9192
Midwest	-6.282867860	6.429675137	1.9952	0.9590
South	-4.340732013	4.354630358	1.6965	0.9628
West[1]	-7.787005357	7.787005357	2.1664	0.8841
STATE / SCHOOL LEVEL				
Alabama / Elementary[1]	-141.9665	141.9665	1.0942	0.9940
Alabama / Secondary[1]	-152.5813	152.5813	1.0915	0.9853
Alaska / Elementary	-136.9659	147.6283	1.1646	0.9630
Alaska / Secondary[1]	-500.1867	500.1867	1.4293	0.8659
Arizona / Elementary	-99.1246	103.8686	1.3622	0.8634
Arizona / Secondary	-95.4492	98.7186	1.0046	0.9096
Arkansas / Elementary[1]	-128.3094	128.3094	1.0542	0.9698
Arkansas / Secondary[1]	-140.2561	140.2561	1.0496	0.9930

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[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$, *where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
California / Elementary[1]	-88.9210	88.9210	1.0758	0.7638
California / Secondary	-76.0916	110.0509	2.1724	0.9598
Colorado / Elementary	-131.0490	135.1988	1.2276	0.9252
Colorado / Secondary	-113.1997	119.7105	1.2216	0.9635
Connecticut / Elementary	-128.8736	129.5130	0.9838	0.9737
Connecticut / Secondary	-114.4072	123.1589	1.3762	0.9133
Delaware / Elementary	-210.2913	216.9577	1.0548	0.8961
Delaware / Secondary[1]	-644.2808	644.2808	1.0387	0.9056
D.C. / Elementary	-225.9421	228.5891	1.0325	0.9538
D.C. / Secondary[1]	-573.9638	573.9638	1.0488	0.9619
Florida / Elementary	-74.1592	74.8692	0.9862	0.9536
Florida / Secondary	-130.5268	145.9581	1.4533	0.9144
Georgia / Elementary	-107.6729	112.7840	1.3041	0.9541
Georgia / Secondary	-118.7199	120.2796	1.0911	0.9842
Hawaii / Elementary	-143.0649	145.6661	1.1314	0.9691
Hawaii / Secondary	-493.0343	497.6608	1.0366	0.9510
Idaho / Elementary	-112.5214	117.6783	1.0936	0.9586
Idaho / Secondary[1]	-165.4705	165.4705	1.1260	0.8985

[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Illinois / Elementary	-117.6666	118.1835	1.0705	0.9736
Illinois / Secondary[1]	-104.9831	104.9831	1.0665	0.8833
Indiana / Elementary	-115.7899	116.7799	1.0183	0.9382
Indiana / Secondary[1]	-139.6308	139.6308	1.0741	0.9843
Iowa / Elementary[1]	-166.6769	166.6769	1.5444	0.9700
Iowa / Secondary	-64.9884	81.9730	1.4343	0.6990
Kansas / Elementary	-109.1722	110.6069	1.0681	0.9581
Kansas / Secondary	-144.6667	147.3895	1.0963	0.9670
Kentucky / Elementary	-107.9958	115.3800	1.3961	0.8717
Kentucky / Secondary[1]	-127.5373	127.5373	1.0527	0.9775
Louisiana / Elementary	-115.0395	116.4414	1.0376	0.9796
Louisiana / Secondary	-147.5234	156.6433	1.2558	0.9844
Maine / Elementary	-119.2632	120.0947	0.9927	0.9555
Maine / Secondary	-153.4392	166.4289	1.3873	0.8443
Maryland / Elementary[1]	-159.1269	159.1269	1.0374	0.9832
Maryland / Secondary[1]	-166.6829	166.6829	1.1122	0.9767
Massachusetts / Elementary[1]	-155.1712	155.1712	1.1481	0.9741
Massachusetts / Secondary[1]	-201.6214	201.6214	1.6623	0.9437

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[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$, *where X is a decimal proportion*

Subpopulation	Parameter			
	A	B	Design Effect	R-Squared
Michigan / Elementary	-106.9428	120.5992	1.4777	0.9303
Michigan / Secondary[1]	-166.2300	166.2300	1.4115	0.9395
Minnesota / Elementary	-78.8040	83.9978	1.0369	0.9137
Minnesota / Secondary	-139.8260	139.9135	1.1774	0.9500
Mississippi / Elementary	-128.3011	130.0745	1.1363	0.9491
Mississippi / Secondary	-92.8718	93.4990	0.9518	0.9399
Missouri / Elementary	-105.2373	105.9826	1.0121	0.9755
Missouri / Secondary[1]	-120.1789	120.1789	1.0569	0.9729
Montana / Elementary	-118.5394	133.2728	1.3153	0.8855
Montana / Secondary[1]	-166.9429	166.9429	1.3876	0.9874
Nebraska / Elementary[1]	-148.9472	148.9472	1.0966	0.8894
Nebraska / Secondary	-148.4630	148.7024	1.2006	0.9619
Nevada / Elementary	-125.4080	135.2325	1.3176	0.8871
Nevada / Secondary	-321.4316	322.3040	1.0877	0.9497
New Hampshire / Elementary	-132.4578	133.6697	1.1175	0.8850
New Hampshire / Secondary	-332.6456	334.2692	1.0654	0.9813
New Jersey / Elementary[1]	-120.2915	120.2915	0.8996	0.8996
New Jersey / Secondary[1]	-179.6192	179.6192	1.1851	0.9680

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[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
New Mexico / Elementary	-140.3819	140.6588	1.1429	0.9420
New Mexico / Secondary	-246.1078	247.8679	1.4832	0.9132
New York / Elementary	-107.1747	107.9317	1.0101	0.9382
New York / Secondary	-216.2815	216.4259	1.8886	0.7104
North Carolina / Elementary[1]	-121.3265	121.3265	1.0886	0.9816
North Carolina / Secondary[1]	-122.0485	122.0485	0.8912	0.9902
North Dakota / Elementary	-26.6149	54.1716	1.2447	0.7774
North Dakota / Secondary	-25.5994	42.6651	0.8523	0.6635
Ohio / Elementary	-105.9409	110.1992	1.0262	0.9638
Ohio / Secondary	-112.8743	113.4772	1.3561	0.9726
Oklahoma / Elementary[1]	-93.5361	93.5361	1.4210	0.9801
Oklahoma / Secondary	-106.9173	109.9492	1.4931	0.9767
Oregon / Elementary	-119.6755	125.8616	1.3167	0.9637
Oregon / Secondary	-123.0011	126.7757	1.1063	0.9683
Pennsylvania / Elementary[1]	-115.4880	115.4880	1.0763	0.9759
Pennsylvania / Secondary[1]	-103.4473	103.4473	1.0028	0.9626
Rhode Island / Elementary	-93.0568	98.5470	0.9530	0.9544
Rhode Island / Secondary[1]	-465.8037	465.8037	1.0805	0.9837

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[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
South Carolina / Elementary	-126.0171	127.2308	1.0810	0.9741
South Carolina / Secondary[1]	-105.3835	105.3835	0.8817	0.8999
South Dakota / Elementary	-100.9355	115.6631	1.4070	0.9287
South Dakota / Secondary	-90.2086	90.7889	1.0640	0.9323
Tennessee / Elementary	-96.6437	99.5791	1.0535	0.9422
Tennessee / Secondary[1]	-138.1482	138.1482	1.0385	0.9769
Texas / Elementary[1]	-56.1426	56.1426	1.1468	0.9946
Texas / Secondary[1]	-100.9117	100.9117	1.1404	0.9878
Utah / Elementary	-101.8779	104.3215	0.9738	0.9656
Utah / Secondary	-120.4839	143.6821	2.0832	0.8638
Vermont / Elementary[1]	-129.9855	129.9855	1.0485	0.9184
Vermont / Secondary	-561.0416	561.5844	1.1180	0.8676
Virginia / Elementary	-118.0339	123.7229	1.2648	0.9337
Virginia / Secondary[1]	-98.4289	98.4289	0.7372	0.9113
Washington / Elementary	-138.5643	138.6187	1.2189	0.9730
Washington / Secondary	-121.1673	135.4704	1.4428	0.9273
W Virginia / Elementary	-133.9114	138.2647	1.1545	0.9665
W Virginia / Secondary	-149.6299	153.6635	1.3274	0.9718

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[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Wisconsin / Elementary[1]	-131.9632	131.9632	0.9411	0.9504
Wisconsin / Secondary[1]	-147.2255	147.2255	1.0160	0.9710
Wyoming / Elementary	-69.1172	100.3507	1.1297	0.8679
Wyoming / Secondary	-232.3900	246.2925	1.0786	0.9344
SECTOR / REGION				
Public / Northeast	-9.670780762	9.677872828	1.3891	0.9353
Public / Midwest	-6.147406105	6.339517638	1.7425	0.9675
Public / South[1]	-4.993764190	4.993716190	1.6310	0.9863
Public / West	-8.709452561	9.033893395	2.5875	0.8468
Private / Northeast	-22.24304567	24.35530790	1.9782	0.9237
Private / Midwest[1]	-35.81335479	35.81335479	3.1342	0.9492
Private / South	-16.40613750	19.52914671	1.7928	0.9502
Private / West[1]	-34.66217664	34.66217664	1.8330	0.9685
SECTOR / COMMUNITY TYPE[2] / MINORITY STATUS				
Public / Urban / Less than 20%[1]	-34.01476506	34.01476506	1.9999	0.9789
Public / Urban / 20% or greater	-12.11660056	12.19680963	1.8961	0.9419
Public / Suburban / Less than 20%	-12.12029970	12.19908173	1.5545	0.9666
Public / Suburban / 20% or greater[1]	-20.01894025	20.01894025	1.6531	0.9898

[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$, *where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Public / Rural / Less than 20%	-4.066055215	4.284471900	1.8917	0.9655
Public / Rural / 20% or greater[1]	-12.98258769	12.98258769	1.8891	0.9763
Private / Urban / Less than 20%	-23.93389634	24.68889618	1.9763	0.9643
Private / Urban / 20% or greater	-32.79769060	34.00809309	1.5967	0.9655
Private / Suburban / Less than 20%	-18.14692398	20.78081970	1.5529	0.9779
Private / Suburban / 20% or greater[1]	-64.54642470	64.54642470	1.9075	0.9645
Private / Rural / Less than 20%	-43.14033853	43.21165700	2.4138	0.9491
Private / Rural / 20% or greater	-160.8662198	165.1465519	1.9902	.09282
SECTOR / SCHOOL LEVEL				
Public / Elementary	-3.087934470	3.135925986	1.5523	0.9703
Public / Secondary	-2.588525418	3.114832335	1.9849	0.9424
Public / Combined[1]	-17.00424168	17.00424168	1.5374	0.9660
Private / Elementary	-10.41632293	10.81219223	1.8584	0.9396
Private / Secondary	-27.34095814	28.76187053	1.6147	0.9625
Private / Combined	-28.80145621	29.45728866	2.2989	0.9566
SECTOR / COMMUNITY TYPE[2]				
Public / Urban[1]	-8.458082039	8.458082039	1.8872	0.9578

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[1] The absolute value of A was setequal to the value of B to avoid negative CV's when the estimate is close to 1.

[2] Community type Urban, Suburban and Rural correspond to Central City, Urban Fringe/Large Town and Rural/Small Town, respectively (see table 2.3).

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Public / Suburban	-7.347400777	7.358065499	1.5060	0.9645
Public / Rural	-2.984161999	3.111263396	1.9461	0.9603
Private / Urban	-14.29831193	14.64160854	1.8475	0.9399
Private / Suburban	-14.46376250	16.68228132	1.8374	0.9733
Private / Rural[1]	-35.19680922	35.19680922	2.3899	0.9358
TYPOLOGY				
Catholic (Parochial)	-25.87231407	26.35396173	1.1058	0.9844
Catholic (Diocesan)	-59.06002930	59.84927113	1.2244	0.9888
Catholic (Private)	-124.7372279	128.0656387	1.5937	0.9722
Other Religious (Cnsrvt Chrstn[3])	-55.55556893	57.68169290	1.8052	0.9685
Other Religious (Affiliated)	-20.65328126	23.36773505	2.1321	0.9498
Other Religious (Unaffiliated)	-73.60068526	80.09079399	2.3382	0.9521
Non-Sectarian (Regular)	-42.25036715	51.99731906	1.7478	0.9611
Non-Sectarian (Special Emphasis)	-86.21740598	93.07287954	2.4964	0.9364
Non-Sectarian[1] (Special Education)	-70.28070443	70.28070443	2.2393	0.9425
SECTOR / COMMUNITY TYPE[2] / SCHOOL SIZE				
Public / Urban / 1-149	-199.6669041	203.0157469	3.0787	0.8796

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[1] The absolute value of A was setequal to the value of B to avoid negative CV's when the estimate is close to 1.

[2] Community type Urban, Suburban and Rural correspond to Central City, Urban Fringe/Large Town and Rural/Small Town, respectively (see table 2.3).

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

Subpopulation	Parameter			
	A	B	Design Effect	R-Squared
Public / Urban / 150-499[1]	-28.74597134	28.74597134	1.6585	0.9888
Public / Urban / 500-749	-30.81139105	30.98282212	1.7013	0.9582
Public / Urban / 750+	-20.90146884	21.50184772	2.1099	0.9595
Public / Suburban / 1-149	-215.2320016	218.2161730	2.6506	0.9301
Public / Suburban / 150-499[1]	-21.52613839	21.52613839	1.4328	0.9632
Public / Suburban / 500-749[1]	-29.58353652	29.58353652	1.5060	0.9840
Public / Suburban / 750+	-26.02685363	26.02685363	2.0202	0.9900
Public / Rural / 1-149	-16.95049458	19.54309259	2.1640	0.9362
Public / Rural / 150-499[1]	-6.555836455	6.555836455	1.7012	0.9694
Public / Rural / 500-749[1]	-17.84909870	17.84909870	1.6952	0.9847
Public / Rural / 750+[1]	-22.42911474	22.42911474	1.7804	0.9648
Private / Urban / 1-149	-45.87913413	46.48824832	2.2639	0.9232
Private / Urban / 150-499	-23.51659192	23.59931281	1.3337	0.9654
Private / Urban / 500-749[1]	-139.5646317	139.5646317	1.5892	0.9897
Private / Urban / 750+	-92.13187083	119.7322982	1.2117	0.9229
Private / Suburban / 1-149	-42.89351638	47.42768769	2.1220	0.9530
Private / Suburban / 150-499	-29.20930341	29.85963680	1.2891	0.9845

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[1] The absolute value of A was setequal to the value of B to avoid negative CV's when the estimate is close to 1.

[2] Community type Urban, Suburban and Rural correspond to Central City, Urban Fringe/Large Town and Rural/Small Town, respectively (see table 2.3).

[3] Conservative Christian

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Private / Suburban / 500-749	-218.1699295	224.2932004	1.3765	0.9232
Private / Suburban / 750+	222.8217542	42.8913672	1.3334	0.7016
Private / Rural / 1-149	-64.70684578	64.70684578	2.4127	0.9476
Private / Rural / 150-499	-60.00584380	60.12922160	1.3775	0.9752
Private / Rural / 500-749	-804.8063954	821.0163411	1.7421	0.9637
Private / Rural / 750+[2]	-6224.431582	6224.431582	3.2628	0.9616
STATE				
Alabama (Public)	-65.34359328	66.34826117	1.5306	0.9852
Alaska (Public)	-62.16992034	63.11790993	1.1710	0.9155
Arizona (Public)	-39.39354192	46.92076735	1.6290	0.8270
Arkansas (Public)	-50.40914418	50.82666672	1.0730	0.9280
California (Public)	-35.82118713	36.32414690	1.5186	0.8005
Colorado[1] (Public)	-74.36443644	74.36443644	1.4125	0.9632
Connecticut (Public)	-63.74026943	64.58013194	1.1847	0.9390
Delaware (Public)	-102.6766364	106.4700209	1.0523	0.8849
D.C. (Public)	-107.6526500	113.3005253	0.9180	0.8817
Florida (Public)	-39.08724249	40.18022933	1.1199	0.9733
Georgia[1] (Public)	-73.41617622	73.41617622	1.5319	0.9598

[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

[2] Results from the iteratively reweighted analysis because the weighted analysis did not converge.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

Subpopulation	Parameter			
	A	B	Design Effect	R-Squared
Hawaii (Public)	-49.55947596	50.40114191	0.9207	0.8061
Idaho (Public)	-49.25182672	51.34246442	1.0206	0.9462
Illinois[1] (Public)	-63.66416292	63.66416292	1.5767	0.9814
Indiana (Public)	-58.20204383	58.39439947	1.2712	0.9535
Iowa (Public)	-81.08994395	81.41202088	1.6461	0.9660
Kansas (Public)	-60.32293275	61.27383333	1.1807	0.9700
Kentucky (Public)	-63.83591295	66.02270906	1.4978	0.9178
Louisiana (Public)	-54.00842129	55.33807082	1.2554	0.9739
Maine (Public)	-57.93914653	60.69386422	1.2027	0.9125
Maryland[1] (Public)	-87.59950600	87.59950600	1.3359	0.9595
Massachusetts[1] (Public)	-94.01428042	94.01428042	1.6277	0.9606
Michigan (Public)	-54.96695263	63.05404861	1.8683	0.9364
Minnesota (Public)	-37.87146936	40.90572981	1.1225	0.9531
Mississippi[1] (Public)	-48.80327899	48.80327899	1.1081	0.9669
Missouri[1] (Public)	-48.51650081	48.51650081	1.0841	0.9538
Montana (Public)	-60.36940699	67.38092441	1.6299	0.9262
Nebraska (Public)	-40.10030487	42.46003294	1.3587	0.7501
Nevada (Public)	-64.36078468	70.64388475	1.2831	0.8929

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[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
New Hampshire (Public)	-81.77624692	82.60346015	1.1256	0.9217
New Jersey[1] (Public)	-84.12289548	84.12289548	1.1243	0.9751
New Mexico (Public)	-71.69910351	75.63521980	1.3404	0.9345
New York[1] (Public)	-52.82574576	52.82574576	1.3551	0.9441
North Carolina[1] (Public)	-67.47566022	67.47566022	1.1817	0.9889
North Dakota (Public)	-19.30804433	28.86439405	1.1993	0.8990
Ohio[1] (Public)	-64.79626073	64.79626073	1.3108	0.9824
Oklahoma (Public)	-40.74570508	42.07250459	1.3214	0.9644
Oregon (Public)	-65.43042618	68.92518308	1.6697	0.9411
Pennsylvania[1] (Public)	-56.93311264	56.93311264	1.2567	0.9718
Rhode Island (Public)	-61.42805209	65.78124565	0.9809	0.9464
South Carolina[1] (Public)	-77.04758045	77.04758045	1.0969	0.9333
South Dakota (Public)	-41.20351287	48.73254488	1.6194	0.8842
Tennessee (Public)	-50.34191995	51.77834571	1.2575	0.9573
Texas[1] (Public)	-32.09548000	32.09548000	1.2539	0.9875
Utah (Public)	-45.19986720	49.12261786	1.2747	0.9073
Vermont (Public)	-74.19666172	79.47928098	1.0579	0.9668
Virginia[1] (Public)	-73.93290091	73.93290091	1.3900	0.9625

[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY
GVFs FOR SCHOOL PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$, *where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Washington (Public)	-59.66764348	60.48890935	1.3688	0.9080
West Virginia (Public)	-62.15517998	64.89528854	1.3774	0.8872
Wisconsin[1] (Public)	-65.80786519	65.80786519	1.1058	0.9533
Wyoming (Public)	-26.95364116	47.89950458	1.2116	0.8776

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[1] The absolute value of A was set equal to the value of B to avoid negative CV's when the estimate is close to 1.

THE SCHOOL SURVEY

GVFs FOR STUDENT TOTALS

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Public	0.590	9872132.241	1.7861	0.7170
Private	1.461	3011463.589	1.1148	0.8484
REGION				
Northeast	1.719	7925623.349	1.3104	0.8006
Midwest	1.267	8200333.593	1.3307	0.8298
South	0.871	7511815.136	1.2803	0.7756
West	2.922	6427052.125	1.7811	0.6566
STATE / SCHOOL LEVEL				
Alabama / Elementary	96.3951	881265.7630	1.5691	0.8108
Alabama / Secondary	84.1841	656261.2546	1.4793	0.8522
Alaska / Elementary	112.4111	282173.1086	1.6146	0.8465
Alaska / Secondary	126.5121	452138.4656	0.6319	0.7001
Arizona / Elementary	23.434	1613685.863	1.1192	0.6775
Arizona / Secondary	143.4826	836145.2357	1.3721	0.7854
Arkansas / Elementary[1]	63.7673	749197.6861	1.3602	0.8327
Arkansas / Secondary	67.0565	474591.4495	1.1910	0.8760
California / Elementary	13.075	8435288.218	1.2164	0.7538

[1] **Removed the following highly skewed variables : NUMBRKG, NUMBR8, NUMBR7**

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
California / Secondary	118.06	10362349.89	1.8143	0.6338
Colorado / Elementary	61.050	1128692.806	1.6277	0.7837
Colorado / Secondary	114.6100	886632.6033	1.0658	0.7383
Connecticut / Elementary	40.377	1218038.392	1.3631	0.7358
Connecticut / Secondary	131.6069	448979.2883	1.5915	0.7940
Delaware / Elementary	77.6488	296587.2474	2.7313	0.7562
Delaware / Secondary	256.50631	94255.18294	2.3466	0.8659
D.C. / Elementary	56.2346	142465.1461	1.6044	0.8761
D.C. / Secondary	210.4610	323693.3523	0.9156	0.8808
Florida / Elementary	28.909	3546890.038	2.4153	0.7841
Florida / Secondary	237.1440	498854.2795	1.9503	0.9117
Georgia / Elementary	52.982	2271255.162	2.8728	0.8984
Georgia / Secondary	60.7920	179891.0650	1.9000	0.9141
Hawaii / Elementary	6.4268	397834.8341	1.2436	0.8589
Hawaii / Secondary	108.7887	925141.8177	2.0111	0.8690
Idaho / Elementary	77.2390	468770.7075	1.4102	0.8168
Idaho / Secondary	98.98090	87772.02819	1.0103	0.7740
Illinois / Elementary	34.05	12371719.72	1.2899	0.8274
Illinois / Secondary	66.3734	8552000	1.3302	0.8233
Indiana / Elementary	68.4601	384648.1027	1.9743	0.8113

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Indiana / Secondary	49.4174	892813.2394	1.3403	0.8052
Iowa / Elementary	56.788	2966463.567	2.6367	0.8008
Iowa / Secondary	74.8508	653037.1866	1.0576	0.7672
Kansas / Elementary	30.266	1566887.122	1.2332	0.8097
Kansas / Secondary	108.7972	784575.3711	0.8535	0.7375
Kentucky / Elementary[1]	91.4872	384981.3377	1.2531	0.8966
Kentucky / Secondary	71.2996	298711.4059	2.3833	0.8916
Louisiana / Elementary	53.064	3024603.858	1.4695	0.8170
Louisiana / Secondary	134.966	2016390.439	1.7726	0.8020
Maine / Elementary	106.1906	439973.0026	1.2519	0.8452
Maine / Secondary	92.2586	199614.1372	1.5847	0.8864
Maryland / Elementary	79.879	1970300.893	1.8264	0.7868
Maryland / Secondary	99.5501	141507.7407	1.7280	0.8582
Massachusetts / Elementary	33.367	7842039.914	1.5410	0.7998
Massachusetts / Secondary	283.531	1044413.272	2.2777	0.6998
Michigan / Elementary	25.463	7152873.014	1.9264	0.7475
Michigan / Secondary	61.284	3165236.349	1.6295	0.8220
Minnesota / Elementary	44.529	1820736.108	1.2986	0.7981

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[1] **Removed the following highly skewed variable : BILNGNUM**

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

Subpopulation	Parameter A	Parameter B	Design Effect	R-Squared
Minnesota / Secondary	181.6533	822858.1159	1.7649	0.7952
Mississippi / Elementary	75.6641	346652.1198	1.6109	0.8811
Mississippi / Secondary	70.6304	154021.3840	1.6830	0.9064
Missouri / Elementary	55.754	1556404.617	1.4633	0.9107
Missouri / Secondary	41.611	1428348.655	0.8746	0.8352
Montana / Elementary	131.8226	326864.5377	1.3182	0.9031
Montana / Secondary	89.02783	21302.65898	0.4523	0.8926
Nebraska / Elementary	75.582	1022072.573	0.8335	0.7640
Nebraska / Secondary	121.9390	523123.0579	0.8107	0.7878
Nevada / Elementary	28.7812	659412.1511	1.0956	0.8962
Nevada / Secondary	153.9917	721074.5403	0.8932	0.7918
New Hampshire / Elementary	127.6971	173148.9040	1.5643	0.6513
New Hampshire / Secondary	184.1553	130633.0611	1.2095	0.7603
New Jersey / Elementary	32.705	3360678.663	1.1720	0.7867
New Jersey / Secondary	172.9476	183184.7554	1.2391	0.8277
New Mexico / Elementary	20.227	1744648.951	1.0005	0.8076
New Mexico / Secondary	214.2540	373050.5472	1.5546	0.8112
New York / Elementary	18.480	5229439.169	1.5402	0.8494
New York / Secondary	224.8873	907484.4442	1.6185	0.8904
North Carolina / Elementary	49.714	1488603.686	2.2206	0.8432

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
North Carolina / Secondary	63.2209	916985.7337	1.7852	0.8114
North Dakota / Elementary	78.5180	267131.5813	1.2379	0.8943
North Dakota / Secondary	136.0005	-1659.122	1.1165	0.9773
Ohio / Elementary	35.659	5085741.035	1.8200	0.8126
Ohio / Secondary	77.705	2664533.030	2.3125	0.7583
Oklahoma / Elementary	37.078	1453983.644	1.7938	0.8912
Oklahoma / Secondary	233.9471	555081.9216	1.3903	0.6103
Oregon / Elementary	18.148	2478084.563	1.3553	0.8571
Oregon / Secondary	97.3239	656219.7683	1.2697	0.7679
Pennsylvania / Elementary	51.642	2005181.432	1.4908	0.8751
Pennsylvania / Secondary	85.264	1162129.916	1.6663	0.8100
Rhode Island / Elementary	33.9203	508538.9918	1.7113	0.7983
Rhode Island / Secondary	136.3619	886398.5370	2.0006	0.7463
South Carolina / Elementary	79.0824	823702.8804	1.5334	0.7978
South Carolina / Secondary	60.7839	182237.2869	1.3996	0.8498
South Dakota / Elementary	139.7984	220606.6240	2.7334	0.7571
South Dakota / Secondary	124.15068	28619.62187	0.7680	0.7990
Tennessee / Elementary	101.8118	316466.3623	1.4221	0.9392
Tennessee / Secondary	107.6710	169773.1536	2.8862	0.8828
Texas / Elementary	38.601	1258098.145	1.6638	0.7398

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Texas / Secondary	117.135	1496901.924	1.3849	0.7598
Utah / Elementary	8.718	1038585.945	1.2525	0.8905
Utah / Secondary	239.5568	807920.0462	1.7621	0.8022
Vermont / Elementary	62.27558	93697.54178	1.2478	0.8789
Vermont / Secondary	70.70434	93445.83532	1.0248	0.9018
Virginia / Elementary	117.3346	238310.8716	1.7591	0.7152
Virginia / Secondary	49.332	2463005.585	1.3476	0.8284
Washington / Elementary	2.474	3707678.248	1.5103	0.8673
Washington / Secondary	142.636	1155233.835	1.5522	0.6946
West Virginia / Elementary	96.4591	156303.3154	1.3367	0.9356
West Virginia / Secondary[1]	106.84565	47541.57792	1.5215	0.8830
Wisconsin / Elementary	32.645	4358598.590	1.7059	0.8315
Wisconsin / Secondary	66.481	1814986.259	1.1053	0.7935
Wyoming / Elementary	126.8938	130664.5436	1.2780	0.8823
Wyoming / Secondary	274.6933	108490.6108	1.0744	0.8253
SECTOR / REGION				
Public / Northeast	1.868	8734057.617	1.7107	0.8012
Public / Midwest	1.138	8523310.406	1.4753	0.8334

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[1] Removed the following highly skewed variables : BILNGNUM, AFTERNUM

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Public / South	0.918	7852576.247	1.6107	0.7841
Public / West	3.804	5852556.111	2.1436	0.6634
Private / Northeast	24.7180	650926.1365	1.1858	0.7273
Private / Midwest	4.015	3470455.852	1.5828	0.8497
Private / South	6.494	2268705.437	1.1202	0.8656
Private / West	9.521	2490961.991	1.6476	0.8499
SECTOR / COMMUNITY TYPE[1] / MINORITY STATUS				
Public / Urban / Less than 20%	56.097	2133356.521	3.5063	0.8387
Public / Urban / Greater than 20%	5.13	13181816.62	2.0679	0.6202
Public / Suburban / Less than 20%	15.111	2535489.471	2.7578	0.9163
Public / Suburban / Greater than 20%	13.85	10561013.56	2.3900	0.6111
Public / Rural / Less than 20%	3.200	4640581.554	1.7438	0.8041
Public / Rural / Greater than 20%	5.77	11317080.00	2.6474	0.8142
Private / Urban / Less than 20%	34.8242	861491.3313	1.8099	0.9147
Private / Urban / Greater than 20%	29.240	4080067.128	1.9248	0.7992
Private / Suburban / Less than 20%	17.917	1831477.722	1.4189	0.8463
Private / Suburban / Greater than 20%	60.975	4049057.203	2.1681	0.6952
Private / Rural / Less than 20%	44.174	1559717.531	1.6645	0.8160

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[1] Community type categories Urban, Suburban, and Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).

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THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

Subpopulation	Parameter			
	A	B	Design Effect	R-Squared
Private / Rural / Greater than 20%	264.401	3520630.280	2.3579	0.6226
SECTOR / SCHOOL LEVEL				
Public / Elementary	0.507	9678553.871	1.7800	0.7732
Public / Secondary	4.651	7121636.197	2.0316	0.7964
Public / Combined	22.772	3728777.113	2.2548	0.8034
Private / Elementary	1.246	2606735.518	1.5913	0.8443
Private / Secondary	11.970	2934766.680	1.4531	0.8436
Private / Combined	16.151	3039076.686	1.2845	0.8365
SECTOR / COMMUNITY TYPE[1]				
Public / Urban	4.26	11127626.44	2.2406	0.6182
Public / Suburban	1.97	10321487.16	2.1143	0.7684
Public / Rural	0.919	8244388.289	1.8167	0.8801
Private / Urban	3.985	2771444.620	1.3780	0.8751
Private / Suburban	5.076	3600659.902	1.5163	0.7697
Private / Rural	16.455	4420924.491	2.2902	0.7602
TYPOLOGY				
Catholic (Parochial)	4.999	4912941.795	2.0634	0.8625

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[1] **Community type categories Urban, Suburban, and Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).**

[2] **Conservative Christian**

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Catholic (Diocesan)	43.209	3147842.443	1.5986	0.7980
Catholic (Private)	28.049	3360120.981	2.3377	0.8363
Other Religious (Cnsrvt Chrstn[2])	23.431	3651556.813	1.5532	0.8178
Other Religious (Affiliated)	7.767	1916211.798	1.9702	0.7791
Other Religious (Unaffiliated)	86.816	1793129.837	0.9154	0.8244
Non-Sectarian (Regular)	17.033	2232026.400	1.6218	0.9011
Non-Sectarian (Special Emphasis)	140.521	1463164.480	2.3466	0.7327
Non-Sectarian (Special Education)	176.4755	810584.7353	3.8274	0.8152
SECTOR / COMMUNITY TYPE[1] / SCHOOL SIZE				
Public / Urban / 1-149	225.712	2191013.570	6.4386	0.7809
Public / Urban / 150-499	12.153	8513459.400	4.2128	0.7408
Public / Urban / 500-749	37.35	11012896.96	7.3773	0.7209
Public / Urban / 750+	17.73	15664979.78	5.2631	0.7056
Public / Suburban / 1-149	165.979	1774506.701	3.8182	0.7582
Public / Suburban / 150-499	14.225	9357091.077	4.1234	0.8221
Public / Suburban / 500-749	15.48	11431843.96	6.9753	0.7928
Public / Suburban / 750+	9.92	10804058.20	6.0889	0.7628
Public / Rural / 1-149	12.407	2734473.709	3.4919	0.8743

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[1] **Community type categories Urban, Suburban, and Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).**

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Public / Rural / 150-499	3.091	6390093.244	3.8471	0.8803
Public / Rural / 500-749	15.320	6323446.948	5.3842	0.7989
Public / Rural / 750+	20.03	12077283.53	6.3423	0.7977
Private / Urban / 1-149	66.1609	780668.4791	2.5682	0.6061
Private / Urban / 150-499	6.830	3274854.523	3.3371	0.8562
Private / Urban / 500-749	139.887	1947316.595	8.1987	0.8509
Private / Urban / 750+	118.887	2057588.031	6.9431	0.7690
Private / Suburban / 1-149	41.359	1208356.030	2.5040	0.7568
Private / Suburban / 150-499	21.247	3373360.764	4.2744	0.8185
Private / Suburban / 500-749	359.621	1933749.197	7.2049	0.7970
Private / Suburban / 750+	629.0486	506837.4931	7.8753	0.7248
Private / Rural / 1-149	57.130	2125964.438	3.4485	0.7789
Private / Rural / 150-499	53.118	2543149.299	5.2813	0.7894
Private / Rural / 500-749	1231.892	2257430.346	8.5532	0.7183
Private / Rural / 750+[1]	3197.1472	-42305.7430	6.0391	0.1644
STATE				
Alabama (Public)	27.519	1841997.722	1.6443	0.7524
Alaska (Public)	65.8009	359927.0883	0.8336	0.7097

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[1] Results from the iteratively reweighted analysis because the weighted analysis did not converge

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Arizona (Public)	40.877	1132329.824	1.2496	0.4633
Arkansas (Public)	43.1218	998505.1339	3.7940	0.7059
California (Public)	18.176	8017917.654	1.1572	0.5164
Colorado (Public)	39.528	1320978.029	1.2651	0.7985
Connecticut (Public)	38.214	1031933.571	1.4476	0.5446
Delaware (Public)	75.0891	385446.7236	1.6235	0.7722
D.C. (Public)	54.8735	126487.5032	0.9564	0.8485
Florida (Public)	56.8617	218570.3169	1.3034	0.9469
Georgia (Public)	48.7086	335232.6193	2.7002	0.8573
Hawaii (Public)	4.3269	541972.4019	0.8970	0.7745
Idaho (Public)	63.4605	422532.4743	1.0165	0.5533
Illinois (Public)	18.74	12200243.78	1.2065	0.7973
Indiana (Public)	32.396	1463013.278	1.5541	0.7169
Iowa (Public)	27.579	3059641.026	2.0092	0.7833
Kansas (Public)	30.565	1628359.581	1.0262	0.7280
Kentucky (Public)	59.0254	379907.0577	1.3985	0.9105
Louisiana (Public)	24.286	3160274.824	1.3093	0.7474
Maine (Public)	57.3516	564467.3924	1.1923	0.8095
Maryland (Public)	34.869	3054928.720	1.6520	0.8086
Massachusetts (Public)	91.489	1366295.146	1.6236	0.4069

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Michigan (Public)	19.152	6651648.154	1.7069	0.7362
Minnesota (Public)	35.116	2812479.141	1.2909	0.6274
Mississippi (Public)	41.7006	337291.0855	1.5528	0.8499
Missouri (Public)	10.170	4291805.506	1.1135	0.8935
Montana (Public)	68.0811	296724.0601	0.8502	0.8589
Nebraska (Public)	55.234	1375218.204	0.6565	0.7301
Nevada (Public)	20.296	1089192.200	0.8756	0.8090
New Hampshire (Public)	87.3865	172709.0904	1.1062	0.4554
New Jersey (Public)	44.814	2254923.692	1.1312	0.7228
New Mexico (Public)	19.766	2116869.545	0.9712	0.7940
New York (Public)	36.705	3704131.524	1.6395	0.6848
North Carolina (Public)	30.910	2188953.102	1.8655	0.8059
North Dakota (Public)	76.8609	201597.0404	0.9674	0.9354
Ohio (Public)	43.988	3012340.221	1.7186	0.7071
Oklahoma (Public)	32.506	1883948.814	1.5754	0.8232
Oregon (Public)	13.276	2438231.752	1.2165	0.8406
Pennsylvania (Public)	31.895	2316529.321	1.2901	0.7224
Rhode Island (Public)	14.8777	855720.1699	1.5032	0.7079
South Carolina (Public)	33.085	1148091.363	1.2804	0.8009
South Dakota (Public)	95.9053	344105.5043	1.5171	0.7263

THE SCHOOL SURVEY
GVFs FOR STUDENT TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Tennessee (Public)	53.450	1470741.288	1.6509	0.8587
Texas (Public)	25.841	3411288.607	1.4011	0.6190
Utah (Public)	19.720	1159994.712	1.2124	0.7290
Vermont (Public)	35.5235	150597.4746	1.1145	0.8658
Virginia (Public)	70.2715	288213.8189	1.5106	0.6166
Washington (Public)	6.548	4534253.676	1.5667	0.8029
West Virginia (Public)	65.1820	162681.2901	1.3488	0.9312
Wisconsin (Public)	20.351	4457008.593	1.3784	0.8205
Wyoming (Public)	110.6214	131475.5865	0.9528	0.801

THE SCHOOL SURVEY

GVFs FOR TEACHER TOTALS

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Public	0.6880	119403.0681	1.4805	0.8522
Private	4.5490	105172.2465	1.2727	0.9042
REGION				
Northeast	3.5368	123059.9191	1.9332	0.9350
Midwest	2.3553	120830.9556	1.9984	0.9103
South	1.3128	103844.7937	1.7931	0.8520
West	3.7402	129318.8725	2.2505	0.8263
STATE / SCHOOL LEVEL				
Alabama/Elementary (Public)	37.16381	62060.64355	1.0719	0.7888
Alabama/Secondary (Public)	36.08423	20198.43705	1.1053	0.8364
Alaska/Elementary (Public)	86.22434	20342.56645	1.3824	0.8473
Alaska/Secondary (Public)	160.19403	22445.59968	1.5824	0.8350
Arizona/Elementary (Public)	18.96259	44634.53526	1.0428	0.7589
Arizona/Secondary (Public)	87.49183	26695.59235	1.3007	0.8236
Arkansas/Elementary (Public)	16.06843	46031.08443	1.0035	0.8322
Arkansas/Secondary (Public)	13.58553	21715.55231	0.8183	0.7481
California/Elementary (Public)	33.02848	85216.79040	1.0406	0.8341
California/Secondary (Public)	76.4709	149381.7921	1.4104	0.7370

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Colorado/Elementary (Public)	26.66472	77795.25826	1.0902	0.7560
Colorado/Secondary (Public)	95.63096	29634.10767	1.2603	0.7889
Connecticut/Elementary (Public)	32.33704	11553.90332	1.0526	0.8598
Connecticut/Secondary (Public)	49.29201	18339.90183	1.0666	0.7239
Delaware / Elementary[1] (Public)	68.94448	30619.22387	1.0463	0.6115
Delaware/Secondary (Public)	299.8382478	558.2285562	1.1542	0.8423
D.C./Elementary (Public)	83.241223	1093.936316	1.2176	0.9024
D.C./Secondary (Public)	139.00254	22685.94934	1.0508	0.8555
Florida / Elementary[1] (Public)	26.4456	146064.3699	0.9499	0.6806
Florida/Secondary (Public)	134.45091	48736.03884	1.4475	0.7283
Georgia/Elementary (Public)	30.32527	64242.93624	1.2597	0.8551
Georgia/Secondary (Public)	24.65094	22953.91515	1.2538	0.8111
Hawaii/Elementary (Public)	18.499073	6114.307434	1.0119	0.8876
Hawaii/Secondary (Public)	116.08554	11201.25352	1.1970	0.7873
Idaho/Elementary (Public)	40.37596	27239.09604	1.0742	0.7888
Idaho/Secondary (Public)	31.02165	19182.35761	1.0876	0.8394
Illinois/Elementary (Public)	80.61158	88506.77352	1.0655	0.8092
Illinois/Secondary (Public)	70.0685	101940.3527	1.2479	0.8080

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[1] Results from the iteratively reweighted analysis because the weighted analysis did not converge

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Indiana/Elementary (Public)	13.59696	67172.35200	1.0839	0.8609
Indiana/Secondary (Public)	18.32155	41215.40622	1.0380	0.8649
Iowa/Elementary (Public)	58.12759	96902.84998	1.4062	0.8570
Iowa/Secondary (Public)	36.56572	30829.57624	0.9991	0.8427
Kansas/Elementary (Public)	20.00294	55475.30050	0.9438	0.8300
Kansas/Secondary (Public)	25.83949	29788.23888	0.8306	0.8570
Kentucky/Elementary (Public)	54.45679	68380.20234	0.9881	0.8995
Kentucky/Secondary (Public)	28.02924	23955.43740	1.2051	0.7876
Louisiana/Elementary (Public)	33.08448	50119.51585	1.0671	0.8747
Louisiana/Secondary (Public)	92.96755	37449.27362	1.4243	0.8317
Maine/Elementary (Public)	47.81716	45016.52996	0.9773	0.8679
Maine/Secondary (Public)	54.03890	17083.88928	1.0760	0.9330
Maryland/Elementary (Public)	42.23945	81471.15154	1.0690	0.7964
Maryland/Secondary (Public)	33.46240	21201.84500	1.1235	0.8491
Massachusetts/Elementary (Public)	32.7941	118757.4100	0.9807	0.7461
Massachusetts/Secondary (Public)	188.99945	54284.74903	1.7202	0.8791
Michigan/Elementary (Public)	43.7665	110408.1074	1.1973	0.8468
Michigan/Secondary (Public)	66.54523	62043.72915	1.0358	0.8277
Minnesota/Elementary (Public)	40.55360	75660.48746	0.9936	0.8732
Minnesota/Secondary (Public)	52.81565	43050.89771	1.1317	0.7759

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Mississippi/Elementary (Public)	25.42851	36160.45159	1.0577	0.8134
Mississippi/Secondary (Public)	29.82561	21918.95480	0.9607	0.8722
Missouri/Elementary (Public)	22.5024	119682.3983	1.0572	0.8664
Missouri/Secondary (Public)	29.14743	10986.59708	0.8571	0.8546
Montana/Elementary (Public)	83.69849	55571.03374	1.3617	0.7939
Montana/Secondary (Public)	51.97959	12020.95808	0.7357	0.8494
Nebraska/Elementary (Public)	50.98576	81545.74203	0.7659	0.8599
Nebraska/Secondary (Public)	61.67748	28562.22708	0.9355	0.8014
Nevada/Elementary (Public)	43.35796	18147.32053	1.0088	0.8092
Nevada/Secondary (Public)	62.97948	11369.73014	0.8955	0.7301
New Hampshire/Elementary (Public)	49.25637	37253.41071	1.3356	0.8330
New Hampshire/Secondary (Public)	144.84696	23722.30431	1.4954	0.7151
New Jersey/Elementary (Public)	25.1276	114757.4034	0.9705	0.7838
New Jersey/Secondary (Public)	77.43675	42881.45143	1.2373	0.7299
New Mexico/Elementary (Public)	18.17567	33801.26449	0.8273	0.7951
New Mexico/Secondary (Public)	121.76496	22892.13956	1.3714	0.8343
New York/Elementary (Public)	14.2463	185476.2380	1.0315	0.8541
New York/Secondary (Public)	68.06270	60422.41783	1.3296	0.5601
North Carolina/Elementary (Public)	10.29783	30822.91623	1.0863	0.8574
North Carolina/Secondary (Public)	27.23156	34291.02986	1.4662	0.8412

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
North Dakota/Elementary (Public)	52.23212	26023.22351	0.8979	0.8374
North Dakota/Secondary (Public)	124.9192295	-126.9186292	0.7855	0.9564
Ohio/Elementary (Public)	24.4916	294861.1672	1.0308	0.8957
Ohio/Secondary (Public)	17.36697	34012.77787	1.0952	0.9093
Oklahoma/Elementary (Public)	28.28307	43148.44981	1.3464	0.8128
Oklahoma/Secondary (Public)	66.33345	49958.07710	1.2635	0.8201
Oregon/Elementary (Public)	33.08278	80697.40839	1.0780	0.8542
Oregon/Secondary (Public)	48.45765	29835.91251	1.2095	0.9040
Pennsylvania/Elementary (Public)	31.8289	121884.5687	1.0556	0.9118
Pennsylvania/Secondary (Public)	31.58264	56829.61395	1.2692	0.9117
Rhode Island/Elementary (Public)	28.28930	19286.76868	0.9567	0.7921
Rhode Island/Secondary (Public)	100.70989	11592.14571	1.2285	0.8100
South Carolina/Elementary (Public)	29.64909	46148.36224	1.1226	0.8193
South Carolina/Secondary (Public)	30.91948	21569.31787	1.3607	0.7646
South Dakota/Elementary (Public)	44.83992	41380.63059	0.9508	0.8263
South Dakota/Secondary (Public)	61.03204	11699.34974	0.8178	0.8380
Tennessee/Elementary (Public)	34.17202	63266.51193	1.1200	0.7723
Tennessee/Secondary (Public)	31.21716	23007.34049	1.1233	0.8960
Texas/Elementary (Public)	9.0274	101837.3910	1.0658	0.8165
Texas/Secondary (Public)	46.51976	87785.18964	1.1840	0.8592

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

Subpopulation	Parameter A	Parameter B	Design Effect	R-Squared
Utah/Elementary (Public)	11.94278	28040.03405	1.0772	0.8098
Utah/Secondary (Public)	125.72066	22650.62202	1.3234	0.8139
Vermont/Elementary (Public)	36.81251	17829.15906	0.9373	0.8329
Vermont/Secondary (Public)	38.3579475	354.5210085	0.9744	0.9418
Virginia/Elementary (Public)	47.93188	54850.13369	1.0423	0.7804
Virginia/Secondary (Public)	45.26034	33460.89960	1.0888	0.8532
Washington/Elementary (Public)	12.16530	66659.56677	1.0178	0.7951
Washington/Secondary (Public)	48.61744	41363.95150	1.1699	0.7887
West Virginia/Elementary (Public)	34.15053	66147.46368	1.1888	0.8280
West Virginia/Secondary (Public)	30.59380	26107.73277	1.4537	0.8467
Wisconsin/Elementary (Public)	42.7531	130576.9281	1.0699	0.8617
Wisconsin/Secondary (Public)	44.63194	49004.82179	0.9017	0.8724
Wyoming/Elementary (Public)	117.74158	25603.05750	1.1672	0.9168
Wyoming/Secondary (Public)	166.29359	15588.72046	1.1112	0.8974
SECTOR / REGION				
Public / Northeast	3.5911	117199.3673	1.8303	0.9091
Public / Midwest	2.1184	112354.4974	1.8727	0.9015
Public / South	0.90248	66619.53911	1.3381	0.8137
Public / West	4.0448	118960.5699	2.3708	0.8148
Private / Northeast	17.3194	103651.1129	2.3585	0.9425

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Private / Midwest	21.05388	88890.96363	2.6679	0.8333
Private / South	15.6240	111780.4036	2.2216	0.8969
Private / West	29.09566	71412.73546	1.9302	0.8410
SECTOR / COMMUNITY TYPE[1] / MINORITY STATUS				
Public / Urban / Less than 20%	33.9469	108079.1100	2.6017	0.8392
Public / Urban / 20% or greater	6.3851	154807.7369	1.6152	0.8620
Public / Suburban / Less than 20%	9.1036	120503.5849	1.5486	0.8541
Public / Suburban / 20% or greater	14.2626	139124.5092	1.9485	0.8473
Public / Rural / Less than 20%	2.3565	118504.2044	1.5160	0.9208
Public / Rural / 20% or greater	8.1916	126527.0966	2.0388	0.8588
Private / Urban / Less than 20%	23.48917	85484.93371	1.4929	0.8414
Private / Urban / 20% or greater	37.4187	120884.3428	1.5075	0.8730
Private / Suburban / Less than 20%	19.5319	111682.0467	1.3006	0.8853
Private / Suburban / 20% or greater	114.93970	65561.58266	1.5391	0.7898
Private / Rural / Less than 20%	58.2389	131124.5511	1.6493	0.8824
Private / Rural / 20% or greater	523.36284	44085.60485	1.7336	0.7943

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[1] **Community type categories Urban, Suburban, and Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).**

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

Subpopulation	Parameter A	Parameter B	Design Effect	R-Squared
SECTOR / SCHOOL LEVEL				
Public / Elementary	0.8198	171396.3679	1.8068	0.8537
Public / Secondary	2.65583	74119.90877	2.0097	0.8380
Public / Combined	27.09286	77186.27630	3.0613	0.8043
Private / Elementary	5.2412	139387.3473	2.2941	0.8754
Private / Secondary	29.27556	51107.39758	2.5122	0.9462
Private / Combined	21.5996	128186.0203	2.0608	0.8626
SECTOR / COMMUNITY TYPE[1]				
Public / Urban	4.2191	138253.5199	1.6395	0.8597
Public / Suburban	3.8938	128741.0789	1.5156	0.8612
Public / Rural	1.1647	125926.3967	1.4925	0.8945
Private / Urban	9.5296	106190.5163	1.3840	0.8584
Private / Suburban	20.29687	59101.26784	1.2303	0.8153
Private / Rural	58.3852	148601.2473	1.7429	0.9409
TYPOLOGY				
Catholic (Parochial)	29.906064	8505.193659	1.9035	0.8829
Catholic (Diocesan)	55.82640	65252.89304	2.6165	0.8131
Catholic (Private)	70.14203	59935.89920	2.2266	0.8436

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[1] Community type categories Urban, Suburban, and Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).

[2] Conservative Christian

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

Subpopulation	Parameter			
	A	B	Design Effect	R-Squared
Other Religious (Cnsrvt Chrstn[2])	49.7787	176509.3547	2.4285	0.8813
Other Religious (Affiliated)	26.87004	61276.94243	2.6384	0.8707
Other Religious (Unaffiliated)	159.61105	25690.65178	2.9237	0.7765
Non-Sectarian (Regular)	41.51533	61844.11049	2.5624	0.9035
Non-Sectarian (Special Emphasis)	255.49228	64294.12906	3.7815	0.8178
Non-Sectarian (Special Education)	215.36831	64649.30268	3.2432	0.7883
SECTOR / COMMUNITY TYPE[1] / SCHOOL SIZE				
Public / Urban / 1-149	207.28234	86404.91658	2.9283	0.8570
Public / Urban / 150-499	22.2025	111603.8803	2.0979	0.8933
Public / Urban / 500-749	40.4540	116622.5970	4.6415	0.8408
Public / Urban / 750+	18.1359	121763.9147	2.7311	0.8597
Public / Suburban / 1-149	228.67858	73367.16663	2.3687	0.8086
Public / Suburban / 150-499	21.7599	138339.3580	2.5588	0.8526
Public / Suburban / 500-749	33.53989	90632.42769	2.7248	0.8505
Public / Suburban / 750+	12.7600	112258.3658	2.7918	0.8841
Public / Rural / 1-149	26.39517	84145.25698	1.9537	0.8705
Public / Rural / 150-499	6.0470	120698,3186	2.4980	0.8753
Public / Rural / 500-749	15.3262	129049.4043	3.7139	0.9244

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[1] **Community type categories Urban, Suburban, and Rural correspond to Central City, Urban Fringe/Large Town, and Rural/Small Town, respectively (see table 2.3).**

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Public / Rural / 750+	28.68165	91578.95423	3.5859	0.8774
Private / Urban / 1-149	69.32158	36996.90318	1.9522	0.7482
Private / Urban / 150-499	22.1502	111052.5408	1.8321	0.8768
Private / Urban / 500-749	100.43517	79181.26443	1.9661	0.8301
Private / Urban / 750+	148.05823	46833.63245	1.9703	0.7991
Private / Suburban / 1-149	56.76879	92451.52008	1.7628	0.8505
Private / Suburban / 150-499	48.47559	64581.55658	1.8397	0.8369
Private / Suburban / 500-749	387.23957	47370.77454	2.3394	0.8042
Private / Suburban / 750+	463.94041	14647.07223	2.1312	0.7111
Private / Rural / 1-149	111.2860	184560.3489	1.8923	0.9191
Private / Rural / 150-499	92.73128	65098.62335	1.6156	0.7852
Private / Rural / 500-749	1209.54704	53562.65061	3.4577	0.7537
Private / Rural / 750+	3627.044362	12551.81673	5.4295	0.3688
STATE				
Alabama (Public)	13.18273	36125.99957	1.1602	0.8412
Alaska (Public)	28.61713	23256.15711	0.9958	0.7710
Arizona (Public)	19.03363	30590.10098	1.0281	0.7463
Arkansas (Public)	8.45549	37223.84458	0.8365	0.7792
California (Public)	18.0573	212091.4706	1.0580	0.7382
Colorado (Public)	13.40515	48599.39142	1.0439	0.7643

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Connecticut (Public)	15.87646	35837.45012	0.9737	0.7666
Delaware (Public)	33.35221	10940.51105	0.9977	0.7761
D.C. (Public)	26.43792	18195.18282	1.0625	0.8616
Florida (Public)	9.16497	35093.85927	0.9569	0.7387
Georgia (Public)	15.03265	42159.20733	1.4690	0.7575
Hawaii[1] (Public)	29.06005	26001.0271	0.7365	0.5879
Idaho (Public)	18.77850	24521.47602	0.9370	0.8175
Illinois (Public)	27.9802	140776.9873	1.1254	0.8185
Indiana (Public)	9.40152	49171.56961	0.9955	0.8321
Iowa (Public)	28.93285	65158.16985	1.2926	0.8450
Kansas (Public)	12.77943	46780.55646	0.9262	0.7852
Kentucky (Public)	26.24243	52536.68263	1.1119	0.8475
Louisiana (Public)	14.97438	41435.54412	1.0652	0.7681
Maine (Public)	25.41351	31849.71802	0.8914	0.9104
Maryland (Public)	26.20615	50876.03674	1.1542	0.7970
Massachusetts (Public)	26.50798	79463.17588	1.0728	0.7610
Michigan (Public)	19.3256	124339.7439	1.1361	0.8461
Minnesota (Public)	24.10341	64628.74556	1.0009	0.8392
Mississippi (Public)	10.69376	28767.82780	0.9717	0.8250
Missouri (Public)	22.73510	11574.12592	0.8888	0.8979

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Montana (Public)	43.62758	21610.53510	1.0245	0.7623
Nebraska (Public)	35.36229	43382.91620	0.7745	0.8579
Nevada (Public)	23.31404	18809.22371	0.8853	0.7771
New Hampshire (Public)	31.41289	30571.30727	0.8795	0.8067
New Jersey (Public)	19.76034	69411.31397	0.8744	0.7714
New Mexico (Public)	40.180179	2892.085584	0.9058	0.8529
New York (Public)	16.0194	177353.0475	1.1343	0.8447
North Carolina (Public)	7.04531	31370.23429	1.0715	0.8335
North Dakota (Public)	39.258987	15709.52871	0.7947	0.8307
Ohio (Public)	21.5191	127701.6669	1.0631	0.8467
Oklahoma (Public)	17.77290	53429.78501	1.2837	0.7924
Oregon (Public)	23.78332	48381.10721	1.0320	0.8626
Pennsylvania (Public)	12.04818	96591.80210	0.9685	0.8174
Rhode Island (Public)	16.22077	17457.69416	0.7353	0.8616
South Carolina (Public)	13.74033	29236.40112	1.0181	0.8377
South Dakota (Public)	33.35484	22054.33032	0.9690	0.8217
Tennessee (Public)	20.70963	36059.84470	1.0691	0.8674
Texas (Public)	6.30479	90909.50251	1.0217	0.7301
Utah (Public)	19.44748	24070.20736	0.8412	0.7553
Vermont (Public)	43.0148616	758.1259264	0.7852	0.9208

THE SCHOOL SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Virginia (Public)	19.70053	54564.58169	0.8464	0.7688
Washington (Public)	11.88127	53326.11241	0.9734	0.7738
West Virginia (Public)	19.83200	44370.43490	1.1853	0.8128
Wisconsin (Public)	24.72342	84985.45049	0.8935	0.8482
Wyoming (Public)	65.06015	18862.45468	0.9485	0.8445

THE SCHOOL ADMINISTRATOR SURVEY

GVFs FOR ADMINISTRATOR TOTALS

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Public	-1.3095	114596.5288	1.7674	0.9533
Private	-2.1584	108809.6278	1.9463	0.9284
REGION				
Region Northeast	-5.4728	118770.7320	1.7313	0.9504
Region Midwest	-3.3209	118461.1436	1.6179	0.9255
Region South	-2.61294	97830.02282	1.4675	0.9682
Region West	-5.8619	130097.1639	1.9653	0.9549
STATE				
Alabama (Public)	-30.33039	43482.61254	1.1907	0.9124
Alaska (Public)	-62.71322	31746.64540	1.4914	0.9556
Arizona (Public)	-26.95292	40700.50594	1.2219	0.9146
Arkansas (Public)	-52.43140	57315.38919	0.9668	0.9707
California (Public)	-27.9611	213511.4961	1.1174	0.9534
Colorado (Public)	-36.14648	53313.01905	1.2626	0.9051
Connecticut (Public)	-33.49597	35564.22927	1.0473	0.9002
Delaware (Public)	-122.22544	20320.43969	0.9498	0.9769
D.C. (Public)	-52.80496	13851.64466	1.0127	0.8147
Florida (Public)	-29.52471	73737.68552	1.0422	0.9342

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Georgia (Public)	-31.12820	64907.18491	2.5268	0.8835
Hawaii (Public)	49.290540	6524.896788	0.8943	0.7797
Idaho (Public)	-42.83684	28442.39470	1.4794	0.9213
Illinois (Public)	-13.17006	75944.08527	2.2878	0.8220
Indiana (Public)	-49.36702	96117.68946	1.8815	0.9408
Iowa (Public)	-27.36020	57927.67616	1.6554	0.9199
Kansas (Public)	-31.68523	47356.65085	0.9219	0.9067
Kentucky (Public)	33.47473	14102.27225	1.3710	0.8361
Louisiana (Public)	-26.72112	49553.53902	1.1025	0.8842
Maine (Public)	-55.88900	45659.22521	1.2362	0.9185
Maryland (Public)	-23.76044	49997.29697	2.7830	0.8560
Massachusetts (Public)	-31.80774	70680.62975	1.2550	0.8990
Michigan (Public)	9.27382	67250.26341	2.0659	0.8087
Minnesota (Public)	-21.42529	44477.79146	1.8597	0.9297
Mississippi (Public)	-35.01547	36114.41952	1.0376	0.9676
Missouri (Public)	-21.71502	51293.05423	1.2767	0.8593
Montana (Public)	-35.94065	43665.60249	1.5859	0.9458
Nebraska (Public)	39.09559	41083.86934	1.6145	0.9332
Nevada (Public)	-73.35466	23496.37250	0.9379	0.9836
New Hampshire (Public)	-47.96236	27757.99802	1.0036	0.9608

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

Subpopulation	Parameter			
	A	B	Design Effect	R-Squared
New Jersey (Public)	-44.7503	100213.4631	1.0829	0.9498
New Mexico (Public)	-53.08243	37047.94482	1.3093	0.9277
New York (Public)	-17.10347	74348.52303	1.2494	0.8655
North Carolina (Public)	-13.08503	33139.53395	1.0754	0.8691
North Dakota (Public)	2.04675	19620.04470	1.0367	0.9403
Ohio (Public)	-42.2746	164796.4656	2.1910	0.9379
Oklahoma (Public)	-16.20737	47316.78457	1.2424	0.9167
Oregon (Public)	-60.40792	74460.33165	1.3918	0.9376
Pennsylvania (Public)	-15.26020	61021.80691	1.2307	0.8659
Rhode Island (Public)	-24.835180	7995.019242	0.9060	0.8584
South Carolina (Public)	-50.38221	56107.46607	1.2190	0.9490
South Dakota (Public)	40.342102	1382.339284	2.0746	0.8933
Tennessee (Public)	-46.91227	81868.94195	1.5919	0.9353
Texas (Public)	-25.6905	151222.1527	1.3466	0.9720
Utah (Public)	-35.77382	32846.38662	1.1025	0.9642
Vermont (Public)	-86.99897	30886.51262	1.1903	0.9641
Virginia (Public)	-36.53274	63660.68125	1.2157	0.9317
Washington (Public)	-43.78704	81668.21744	1.0687	0.9318
West Virginia[1] (Public)	-38.58123	45498.14205	1.1389	0.9148

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[1] **Removed the following highly skewed variable : ASC017**

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Wisconsin (Public)	-31.43935	87349.80909	1.5404	0.9459
Wyoming (Public)	-51.39426	25303.75849	1.0893	0.9585
SECTOR / REGION				
Public / Northeast	-6.78003	96012.76650	1.5929	0.9139
Public / Midwest	-4.3044	113832.3645	1.5921	0.9376
Public / South	-3.55155	97959.97907	1.6045	0.9747
Public / West	-7.0104	122364.5947	1.9977	0.9565
Private / Northeast	8.52314	60916.31217	1.6588	0.8807
Private / Midwest	-7.6005	123379.3399	2.3380	0.9181
Private / South	14.02932	62506.70684	1.4209	0.9333
Private / West	23.47928	38607.93726	1.9381	0.8653
SECTOR / SCHOOL LEVEL				
Public / Elementary	-2.6284	153923.5418	1.5802	0.9601
Public / Secondary	-2.66466	73392.50929	2.3787	0.9656
Public / Combined	10.08657	46625.57761	3.0286	0.8899
Private / Elementary	9.59726	22381.70632	1.4408	0.9050
Private / Secondary	-10.35691	66902.09047	2.5488	0.9377
Private / Combined	8.95027	69000.65588	1.7580	0.8845

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

Subpopulation	Parameter			
	A	B	Design Effect	R-Squared
STATE / SCHOOL LEVEL				
Alabama / Elementary	-107.70211	90601.78615	1.0581	0.9685
Alabama / Secondary	49.348103	1893.234625	1.1780	0.8960
Alaska / Elementary	-78.96107	20059.86977	1.1590	0.9392
Alaska / Secondary	-244.66769	39842.86857	3.4530	0.8635
Arizona / Elementary	-71.30894	63746.74173	1.1490	0.9512
Arizona / Secondary	-49.12132	21065.87293	1.1209	0.9559
Arkansas / Elementary	-102.46703	67602.53794	0.9818	0.9583
Arkanzas / Secondary	-126.78919	53183.42943	1.0779	0.9874
California / Elementary	-13.4580	147589.3398	0.9603	0.8435
California / Secondary	-85.7963	159938.2057	1.5729	0.9735
Colorado / Elementary	-88.65751	97532.56670	1.4436	0.9709
Colorado / Secondary	-29.34111	34886.20614	1.9375	0.9443
Connecticut / Elementary	-112.13550	85008.43009	1.1215	0.9817
Connecticut / Secondary	-99.92484	26432.66972	1.2652	0.9596
Delaware / Elementary	-209.32396	22751.73601	0.9801	0.9814
Delaware / Secondary	-318.13384	17185.60179	1.1425	0.8999
D.C. / Elementary	-210.08596	25396.56546	1.0546	0.9792
D.C. / Secondary	-36.62481	13278.71902	1.1394	0.7023
Florida / Elementary	-58.1800	100606.6985	1.0219	0.9318

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Florida / Secondary	-57.33975	51560.32511	1.3474	0.9067
Georgia / Elementary	-109.5882	151921.5769	1.2028	0.9919
Georgia / Secondary	-82.57330	34556.65958	1.3841	0.9440
Hawaii / Elementary	25.972067	9576.350005	0.8410	0.8548
Hawaii / Secondary	151.772927	5915.163945	1.1457	0.6590
Idaho / Elementary	-137.39798	51548.44542	1.7638	0.9676
Idaho / Secondary	-96.77930	20773.44572	1.3683	0.9538
Illinois / Elementary	-78.5442	268110.1600	1.0347	0.9745
Illinois / Secondary	83.38841	41768.50434	4.3296	0.8140
Indiana / Elementary	-122.4716	170222.4960	1.1118	0.9887
Indiana / Secondary	-75.94926	39714.49116	1.4124	0.9447
Iowa / Elementary	-59.38216	88522.19584	2.2662	0.9404
Iowa / Secondary	-54.78417	32825.74709	1.9597	0.9108
Kansas / Elementary	0.88085	13937.29391	1.1376	0.8660
Kansas / Secondary	-99.68548	41189.39666	1.1241	0.9306
Kentucky / Elementary	-89.6680	109520.2461	1.3027	0.9607
Kentucky / Secondary	-89.37243	32650.32766	1.1530	0.9534
Louisiana / Elementary	-103.5614	103166.0173	1.0274	0.9764
Louisiana / Secondary	-30.11374	27956.00899	1.0911	0.8869
Maine / Elementary	-109.92765	71771.92469	1.3108	0.9534

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Maine / Secondary	-184.71156	31956.80896	1.8631	0.9598
Maryland / Elementary	-137.4326	139346.6797	1.2145	0.9801
Maryland / Secondary	-133.00101	35644.93885	1.4849	0.9757
Massachusetts / Elementary	-79.8038	130812.1674	1.2422	0.9380
Massachusetts / Secondary	59.34600	33401.64059	1.8362	0.9717
Michigan / Elementary[1]	78.61908	29457.75411	1.3771	0.8436
Michigan / Secondary	-97.54549	83897.99281	1.8660	0.9185
Minnesota / Elementary	-12.38125	40065.90750	0.9526	0.9018
Minnesota / Secondary	-46.46587	35076.34641	1.5220	0.9354
Mississippi / Elementary	-110.26832	61227.12671	1.0389	0.9909
Mississippi / Secondary	-84.98448	33146.18671	1.4089	0.9814
Missouri / Elementary	-121.0518	166786.8915	1.5047	0.9681
Missouri / Secondary	-70.89212	50189.33633	1.1477	0.9635
Montana / Elementary	-81.97421	56139.64320	1.4219	0.9795
Montana / Secondary	-39.38002	21068.77227	1.5220	0.9161
Nebraska / Elementary	138.36205	38170.42756	1.8773	0.9027
Nebraska / Secondary	-54.76681	31862.55546	1.4242	0.9254
Nevada / Elementary	-105.25132	23642.35362	1.0242	0.9593

[1] **Removed the following highly skewed variable : ASC017**

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Nevada / Secondary	-203.27739	20069.24998	1.0160	0.9761
New Hampshire / Elementary	-105.01478	42667.73928	1.4295	0.9770
New Hampshire / Secondary	-191.92490	26269.61020	1.7949	0.9730
New Jersey / Elementary	-103.5289	181880.4728	1.0101	0.9862
New Jersey / Secondary	-109.83827	56884.58634	1.4775	0.9673
New Mexico / Elementary	-115.18202	57283.74817	1.3419	0.9781
New Mexico / Secondary	-121.13997	24228.83209	1.2839	0.9647
New York / Elementary	3.51643	33305.90329	1.1509	0.9008
New York / Secondary	-74.8993	101331.5335	1.5635	0.9289
North Carolina / Elementary	12.40860	28414.32497	1.2935	0.8527
North Carolina / Secondary	22.861688	8943.394101	1.4070	0.8326
North Dakota / Elementary	-24.14197	26242.58460	1.0433	0.9655
North Dakota / Secondary	-16.71365	11598.91609	1.1055	0.9052
Ohio / Elementary	-110.5569	300195.0245	1.0491	0.9735
Ohio / Secondary	-78.94888	95274.88279	1.3338	0.9736
Oklahoma / Elementary	-13.81262	46311.20367	1.4770	0.8621
Oklahoma / Secondary	-34.43998	33638.39351	1.4599	0.9049
Oregon / Elementary	-119.2291	107953.8347	1.2329	0.9602
Oregon / Secondary	-86.14253	32231.12972	2.0332	0.9687
Pennsylvania / Elementary	-78.8494	198079.8435	1.3540	0.9512

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Pennsylvania / Secondary	-56.29001	54266.92760	1.3808	0.9006
Rhode Island / Elementary	-121.39577	28841.18230	1.0490	0.9756
Rhode Island / Secondary	3.058145	3212.280632	1.0115	0.8698
South Carolina / Elementary	-137.5059	105774.3245	1.1599	0.9872
South Carolina / Secondary	-66.67051	25964.11406	1.1546	0.9233
South Dakota / Elementary	78.0787797	797.6587609	1.5555	0.9100
South Dakota / Secondary	-49.44009	21904.96364	1.6641	0.9207
Tennesse / Elementary	-113.5762	128959.9603	1.2095	0.9783
Tennesse / Secondary	-87.82107	36594.71028	1.2386	0.9545
Texas / Elementary	-46.7916	194953.0602	1.0954	0.9844
Texas / Secondary	-64.9438	102903.6717	1.8988	0.9695
Utah / Elementary	-55.84539	28696.87304	0.7868	0.9199
Utah / Secondary	-31.62329	23350.10277	1.9229	0.9308
Vermont / Elementary	-106.64104	31726.35372	1.2288	0.9548
Vermont / Secondary	-599.26359	30234.94633	1.3218	0.9731
Virginia / Elementary	-95.8704	126335.3440	1.1035	0.9281
Virginia / Secondary	-71.47842	37680.81789	1.0927	0.9780
Washington / Elementary	-32.18478	63636.35047	1.0761	0.8053
Washington / Secondary	-117.94391	60336.70844	1.2107	0.9398
West Virginia / Elementary	-110.46637	84825.40114	1.1762	0.9562

THE SCHOOL ADMINISTRATOR SURVEY
GVFs FOR ADMINISTRATOR TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
West Virginia / Secondary	88.3322040	-166.0893880	2.9929	0.9720
Wisconsin / Elementary	-68.9373	122361.9185	1.6732	0.9370
Wisconsin / Secondary	-120.08982	71128.74659	1.7376	0.9786
Wyoming / Elementary	-77.68636	30864.03361	1.2686	0.9544
Wyoming / Secondary	27.57603	18387.13268	1.9969	0.9345
TYPOLOGY				
Catholic (Parochial)	36.99623	15704.97552	0.9541	0.8963
Catholic (Diocesan)	13.66281	78900.34685	1.3916	0.9129
Catholic (Private)	-37.799243	83550.54357	2.1496	0.9295
Other Religious (Cnsrvt Chrstn[1])	48.65830	85729.81910	1.6937	0.9046
Other Religious (Affiliated)	19.28724	32966.48582	2.3462	0.8909
Other Religious (Unaffiliated)	166.81844	25839.57690	2.4140	0.8681
Non-Sectarian (Regular)	45.35614	51801.14026	2.8664	0.8705
Non-Sectarian (Special Emphasis)	145.60166	71781.45648	2.4374	0.8888
Non-Sectarian (Special Education)	142.08585	36952.99037	2.8574	0.6928

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[1] **Conservative Christian**

THE SCHOOL ADMINISTRATOR SURVEY

GVFs FOR ADMINISTRATOR PROPORTIONS

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Public	-1.771018041	1.770999652	1.7807	0.9763
Private	-3.870831755	5.320700296	2.3694	0.9728
REGION				
Northeast	-9.233401182	9.312955327	2.1596	0.9941
Midwest	-3.611222745	4.396782658	2.6416	0.9440
South	-3.225538532	3.305522791	1.6131	0.9856
West	-6.899517247	7.035076216	2.5425	0.9459
STATE				
Alabama (Public)	-42.92256598	42.93282505	1.1647	0.9355
Alaska (Public)	-51.58362809	60.25079327	1.0623	0.9673
Arizona (Public)	-53.38853037	54.15663557	1.3579	0.9582
Arkansas (Public)	-59.67589505	59.63708502	0.9433	0.9956
California (Public)	-45.48510781	44.56723987	1.4848	0.9404
Colorado (Public)	-64.60081332	73.66614828	1.5133	0.9803
Connecticut (Public)	-7.73565497	47.76579587	1.2428	0.8760
Delaware (Public)	-169.3317823	168.9619288	1.1811	0.9179
D.C. (Public)	-163.1484900	155.3553269	0.9855	0.9650
Florida (Public)	-25.64303219	34.63328647	1.0115	0.9708

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	**A**	**B**	**Design Effect**	**R-Squared**
Georgia (Public)	-28.55861908	49.63788550	1.4094	0.8920
Hawaii (Public)	-80.31108766	81.44121249	0.9489	0.9475
Idaho (Public)	-62.56385192	61.71583960	0.9886	0.9776
Illinois (Public)	-5.55260804	37.59715602	1.6533	0.8578
Indiana (Public)	-59.85362717	61.81396583	1.3574	0.9153
Iowa (Public)	-39.75974762	46.69874475	1.1598	0.9163
Kansas (Public)	-80.531224	68.768360	0.9398	0.9669
Kentucky (Public)	-79.82274205	79.68830219	1.3920	0.9953
Louisiana (Public)	8.03415494	30.34165276	1.1771	0.8754
Maine (Public)	-53.61722213	79.32302357	1.4042	0.9594
Maryland (Public)	16.46971087	36.19471836	1.0403	0.8964
Massachusetts (Public)	0.38856791	36.96736225	1.3348	0.8272
Michigan (Public)	-53.97800589	66.23253941	1.6869	0.9719
Minnesota (Public)	-80.14526185	72.60168762	1.3689	0.9759
Mississippi (Public)	-54.14317536	54.46094424	1.2920	0.9650
Missouri (Public)	3.70583307	30.16506727	1.1753	0.8539
Montana (Public)	-70.28471918	74.16266305	1.2625	0.9689
Nebraska (Public)	-124.4801580	126.2621644	2.2858	0.9138
Nevada (Public)	-71.04246258	86.14275335	1.1555	0.9752

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
New Hampshire (Public)	-81.42376877	91.82974584	1.1231	0.9925
New Jersey (Public)	-95.63813628	86.17840385	1.5416	0.9783
New Mexico (Public)	-72.51680326	76.93154461	1.2307	0.9719
New York (Public)	-57.347583	55.496110	1.2920	0.9720
North Carolina (Public)	-44.000136	62.829250	1.2738	0.9156
North Dakota (Public)	-32.77752037	42.78500154	1.0710	0.9446
Ohio (Public)	-116.3613978	92.9048859	1.6875	0.9629
Oklahoma (Public)	-55.07859321	57.36182606	1.6453	0.9818
Oregon (Public)	-94.16843329	85.33421137	1.5334	0.9339
Pennsylvania (Public)	-24.30978649	53.35688935	1.5908	0.9387
Rhode Island (Public)	-114.5391357	116.4322327	1.2550	0.9801
South Carolina (Public)	-56.97353493	64.95133458	1.2549	0.9960
South Dakota (Public)	-59.16164701	61.18041015	1.3217	0.9455
Tennessee (Public)	-75.95808764	76.00511719	1.4948	0.9846
Texas (Public)	-29.46214344	29.48915057	1.2064	0.9958
Utah (Public)	-57.97015108	57.69306969	1.0851	0.9640
Vermont (Public)	-87.48473538	91.89714929	1.0712	0.9580
Virginia (Public)	45.16859084	33.87419080	1.8616	0.7652
Washington (Public)	-38.12682546	56.28769553	1.2163	0.9754

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
West Virginia (Public)	-55.12791994	68.50781780	1.2916	0.9838
Wisconsin (Public)	-53.75294660	61.98820033	1.1753	0.9571
Wyoming (Public)	-85.07249819	81.84640233	0.9912	0.9897
SECTOR / REGION				
Public / Northeast	6.215403205	3.654927997	1.8826	0.8563
Public / Midwest	-5.201819847	5.834544313	1.6696	0.9125
Public / South	-4.166622405	4.165750302	1.3780	0.9883
Public / West	-9.254285387	9.252490181	2.3919	0.9568
Private / Northeast	-20.23388744	21.97786916	2.0898	0.9597
Private / Midwest	-3.15959184	15.72245610	3.0991	0.9556
Private / South	-19.39084172	21.11024593	1.8431	0.9859
Private / West	-28.87447306	31.47916336	2.2483	0.9825
SECTOR / SCHOOL LEVEL				
Public / Elementary	-1.215157222	2.355590148	1.4648	0.8948
Public / Secondary	-4.605425021	4.604939144	1.6533	0.9964
Public / Combined	-15.99978327	16.04935530	1.6017	0.9738
Private / Elementary	-7.55327178	10.04359278	2.1853	0.9818
Private / Secondary	-24.21204792	24.22755100	1.2532	0.9761
Private / Combined	-0.412966108	8.511821199	1.7633	0.8362

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
STATE / SCHOOL LEVEL				
Alabama / Elementary	-119.7133722	111.3618073	0.8895	0.9668
Alabama / Secondary	-140.8473849	142.0516763	1.0536	0.9927
Alaska / Elementary	-141.3700734	148.9222457	0.9782	0.9948
Alaska / Secondary	-455.8598915	450.7859591	1.2839	0.9739
Arizona / Elementary	-56.93123736	75.71614060	0.9621	0.9215
Arizona / Secondary	-125.6948741	120.0358934	1.1092	0.9701
Arkansas / Elementary	-65.20301255	94.51612216	0.9650	0.8822
Arkansas / Secondary	-100.9322935	101.4734126	0.9482	0.9626
California / Elementary	-84.08171373	76.92830677	1.0510	0.9800
California / Secondary	-132.5203168	131.4887720	1.6125	0.9643
Colorado / Elementary	-114.2619860	127.3405780	1.2388	0.9573
Colorado / Secondary	-144.1019196	142.8148051	1.1968	0.9671
Connecticut / Elementary	-138.2443098	133.6905060	0.9890	0.9586
Connecticut / Secondary	-165.7392334	160.5091803	1.1440	0.9824
Delaware / Elementary	-183.3860311	226.4595176	0.9997	0.8773
Delaware / Secondary	-1109.171826	904.361610	1.6070	0.9431
D.C. / Elementary	-226.6206655	227.0882868	0.9579	0.9368
D.C. / Secondary	-781.4596190	709.1896790	1.1417	0.9320

THE SCHOOL ADMINISTRATORS SURVEY
GVFS FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Florida / Elementary	-50.65752462	62.96901082	0.9702	0.9031
Florida / Secondary	-200.9200380	202.8017797	1.6207	0.9590
Georgia / Elementary	-136.0114556	128.7491180	1.1807	0.9768
Georgia / Secondary	-136.1315265	136.8126513	1.0972	0.9820
Hawaii / Elementary	-101.1924040	102.7498797	0.9186	0.9399
Hawaii / Secondary	-536.8569847	537.3871978	1.0287	0.9988
Idaho / Elementary	-170.655746	144.114311	0.7031	0.9868
Idaho / Secondary	-160.0140675	152.8547734	1.0474	0.9508
Illinois / Elementary	-135.271708	124.114507	1.0853	0.9152
Illinois / Secondary	-54.55256918	79.79614996	1.4929	0.8477
Indiana / Elementary	-154.0330979	130.6519167	1.0236	0.9762
Indiana / Secondary	-120.1581799	121.6941598	1.0866	0.9768
Iowa / Elementary	-121.0674351	114.2511611	1.2366	0.9064
Iowa / Secondary	-95.4823084	115.7034045	1.1513	0.9732
Kansas / Elementary	-119.3711576	111.0771539	0.9522	0.9603
Kansas / Secondary	-239.231093	216.749294	1.1385	0.9954
Kentucky / Elementary	-153.3416133	140.5295829	1.1121	0.9834
Kentucky / Secondary	-129.7111693	147.6948560	1.2783	0.9858
Louisiana / Elementary	-164.3367207	156.6421427	1.1870	0.9724

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$, *where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Louisiana / Secondary	-93.5125920	132.8190493	1.0304	0.9733
Maine / Elementary	-138.5221776	155.2366228	1.2953	0.9925
Maine / Secondary	-56.7345211	119.9268937	0.9974	0.9380
Maryland / Elementary	-141.4232471	143.7968042	0.9644	0.8451
Maryland / Secondary	-91.6095755	101.9760640	0.8464	0.9526
Massachusetts / Elementary	70.15587940	18.93788517	0.8387	0.7833
Massachusetts / Secondary	-111.0125819	135.9800691	1.2805	0.9602
Michigan / Elementary	-78.2634974	103.2452165	1.1664	0.9690
Michigan / Secondary	-192.5774299	187.3227560	1.5564	0.9728
Minnesota / Elementary	-95.3925195	109.8904292	1.2472	0.8870
Minnesota / Secondary	-110.5946660	113.8903416	1.0170	0.9749
Mississippi / Elementary	-159.1426145	144.5498701	1.2057	0.9583
Mississippi / Secondary	-96.0719124	106.9694322	1.1251	0.9827
Missouri / Elementary	-81.0821010	102.2596582	1.0253	0.9752
Missouri / Secondary	-48.92557232	83.31406594	1.0469	0.9310
Montana / Elementary	-98.5209409	110.8538921	0.8840	0.9815
Montana / Secondary	-199.0284888	190.4943232	1.4651	0.9847
Nebraska / Elementary	-254.9542556	236.9612402	1.8109	0.9063
Nebraska / Secondary	-98.3561628	124.3668557	1.1667	0.9568

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$, *where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Nevada / Elementary	-66.6770626	109.6799820	1.1139	0.9348
Nevada / Secondary	-403.2238153	405.3015411	1.3227	0.9782
New Hampshire / Elementary	-168.5698845	154.7093342	1.0682	0.9710
New Hampshire / Secondary	-273.8191177	315.9360589	1.1483	0.9532
New Jersey / Elementary	-130.3749887	129.4870283	1.1370	0.9857
New Jersey / Secondary	-127.9962833	118.9651453	0.8985	0.9219
New Mexico / Elementary	-124.6248337	129.2321759	1.0737	0.9737
New Mexico / Secondary	-175.5537773	200.4981555	1.2778	0.9446
New York / Elementary	-112.446780	105.805900	0.8409	0.9867
New York / Secondary	40.179430	69.845438	1.1406	0.8319
North Carolina / Elementary	-50.485719	93.308855	0.9883	0.9323
North Carolina / Secondary	-103.044181	105.804895	0.7570	0.9836
North Dakota / Elementary	-55.98941338	81.87589460	1.0281	0.9403
North Dakota / Secondary	-76.35077849	80.81636224	0.9039	0.9339
Ohio / Elementary	-192.0564156	159.4473316	1.1567	0.9686
Ohio / Secondary	-128.3475235	122.0240650	1.3088	0.9712
Oklahoma / Elementary	-94.5516777	101.7651389	1.6353	0.9782
Oklahoma / Secondary	-108.3900604	107.9732901	1.2324	0.9792
Oregon / Elementary	-163.8209552	147.2048439	1.1785	0.9626

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Oregon / Secondary	-114.0778432	122.3037729	1.0549	0.9635
Pennsylvania / Elementary	-97.2652048	116.6384360	1.2087	0.9859
Pennsylvania / Secondary	-170.8541784	145.9718109	1.3606	0.9939
Rhode Island / Elementary	-169.5579980	169.4963482	1.2664	0.9923
Rhode Island / Secondary	-469.2217863	465.0546979	1.1526	0.9982
South Carolina / Elementary	-130.8320808	133.8556256	1.0408	0.9866
South Carolina / Secondary	-136.3813128	134.9223293	1.2400	0.9844
South Dakota / Elementary	-129.2148519	126.6634274	1.1976	0.9311
South Dakota / Secondary	-77.38549428	81.59293286	1.1466	0.9199
Tennessee / Elementary	-137.0883083	136.8838823	1.0855	0.9929
Tennessee / Secondary	-152.6144879	148.8921563	1.1455	0.9870
Texas / Elementary	-54.14838599	52.61249666	1.0594	0.9919
Texas / Secondary	-90.67741413	89.37590753	1.1603	0.9788
Utah / Elementary	-111.6910719	105.9781027	0.9295	0.9604
Utah / Secondary	-108.5011919	123.3898339	1.1503	0.9389
Vermont / Elementary	-135.0870180	133.2631529	1.1966	0.9207
Vermont / Secondary	-548.4530692	561.5766565	1.0696	0.9903
Virginia / Elementary	-179.1699557	176.8181189	1.4570	0.9019
Virginia / Secondary	-127.1499222	131.8869805	1.1355	0.9742

THE SCHOOL ADMINISTRATORS SURVEY
GVFs FOR ADMINISTRATOR PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$ *, where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Washington / Elementary	-101.8339833	127.3506042	1.2417	0.9765
Washington / Secondary	-128.0594964	140.9452800	1.1456	0.9867
West Virginia / Elementary	-104.7357592	124.8775893	1.1220	0.9821
West Virginia / Secondary	-147.9265325	151.5831097	1.1825	0.9838
Wisconsin / Elementary	-102.2020675	103.7285769	0.9760	0.9291
Wisconsin / Secondary	-142.0851371	141.7117385	1.1423	0.9567
Wyoming / Elementary	-131.9761607	128.7496643	0.9011	0.9855
Wyoming / Secondary	-258.2029094	260.5136320	1.0810	0.9654
TYPOLOGY				
Catholic (Parochial)	-37.71239444	34.11626861	1.0984	0.9922
Catholic (Diocesan)	-46.21994988	47.03974144	0.9574	0.9873
Catholic (Private)	-114.8380695	115.5068543	1.3087	0.9953
Other Religious (Cnsrvt Chrstn[1])	-21.93489144	33.99722123	1.6923	0.8800
Other Religious (Affiliated)	-16.83603190	17.31316190	2.3992	0.8954
Other Religious (Unaffiliated)	49.70663609	46.46631122	2.7643	0.8566
Non-Sectarian (Regular)	-55.94870055	60.34555127	1.9791	0.9838
Non-Sectarian (Special Emphasis)	-79.85551029	80.48440076	1.6907	0.9403
Non-Sectarian (Special Education)	-232.7523155	208.4017205	2.4102	0.9801

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[1] Conservative Christian

THE TDS SURVEY

GVFs FOR TOTALS (PRIVATE SCHOOLS)

THE TDS SURVEY
GVFs FOR TOTALS (PRIVATE SCHOOLS)

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Private	3.7840	170681.7233	1.2311	0.8942
REGION				
Northeast	16.5604	109131.1106	1.0202	0.8669
Midwest	9.5648	141437.7794	1.0975	0.9134
South	12.2202	199007.2757	1.1115	0.8769
West	18.0515	168239.8690	1.5787	0.9259
TYPOLOGY				
Catholic (Parochial)	12.6269	163270.3029	1.2967	0.8823
Catholic (Diocesan)	36.0007	180439.2087	1.3284	0.9243
Catholic (Private)	46.9355	159416.7506	1.3921	0.9111
Other Religious (Cnsrvt Chrstn[1])	39.1886	269370.4887	1.5257	0.8381
Other Religious (Affiliated)	20.4843	111584.4739	1.5167	0.8941
Other Religious (Unaffiliated)	104.13575	78931.73553	0.9568	0.8256
Non-Sectarian (Regular)	34.4276	113025.0237	1.0313	0.8462
Non-Sectarian (Special Emphasis)	228.6982	141466.2125	1.8594	0.8323
Non-Sectarian (Special Education)	251.84910	14275.46048	1.5254	0.8243

[1] Conservative Christian

THE TDS SURVEY
GVFs FOR TOTALS (PRIVATE SCHOOLS)

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SCHOOL LEVEL				
Elementary	3.8033	157454.4527	1.2827	0.8770
Secondary	30.4380	112937.3413	2.4151	0.9182
Combined	17.5089	200881.3254	1.0842	0.8416
MINORITY STATUS				
Less than 20%	5.5342	208027.4874	1.1533	0.8883
20% or greater	27.1498	154699.9448	1.5813	0.8811

THE TDS SURVEY

GVFs FOR PROPORTIONS (PRIVATE SCHOOLS)

THE TDS SURVEY
GVFs FOR PROPORTIONS (PRIVATE SCHOOLS)

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$, *where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Private	5.57165665	7.305077066	2.0494	0.9296
REGION				
Northeast	108.182742	18.7882060	1.5659	0.8721
Midwest	361.525990	14.1687030	2.4695	0.4583
South	-24.488478	21.91741712	1.7345	0.8682
West	57.0935162	34.47097922	2.1340	0.8955
TYPOLOGY				
Catholic (Parochial)	43.8577981	24.60480648	0.7665	0.9634
Catholic (Diocesan)	-27.644247	47.20799642	0.9189	0.9399
Catholic (Private)	201.992289	56.4556484	0.5556	0.8675
Other Religious (Cnsrvt Chrstn[1])	227.417660	52.8174609	2.9864	0.7703
Other Religious (Affiliated)	95.4297656	18.97405550	2.3856	0.8083
Other Religious (Unaffiliated)	48.1944717	56.66974622	1.4068	0.8021
Non-Sectarian (Regular)	199.790809	52.5620517	2.0943	0.7510
Non-Sectarian (Special Emphasis)	192.776917	39.6204717	1.0783	0.9071
Non-Sectarian (Special Education)	796.157210	51.1905842	1.4866	0.7189

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[1] **Conservative Christian**

THE TDS SURVEY
GVFs FOR PROPORTIONS (PRIVATE SCHOOLS)

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$, *where X is a decimal proportion*

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SCHOOL LEVEL				
Elementary	-19.644520	9.93559109	1.2096	0.9774
Secondary	78.8160014	18.05153544	0.9467	0.8511
Combined	61.8173062	32.29681845	3.7964	0.8212
MINORITY STATUS				
Less than 20%	9.37524875	9.847586692	1.9988	0.8682
20% or greater	30.3893498	17.50922949	1.6276	0.9483

THE TEACHER SURVEY

GVFs FOR TEACHER TOTALS

THE TEACHER SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

Subpopulation	Parameter A	Parameter B	Design Effect	R-Squared
SECTOR				
Public	0.128	1386449.811	4.9558	0.9336
Private	1.2969	950527.2641	3.3217	0.9582
REGION				
Region Northeast	0.182	1648211.537	3.8797	0.9401
Region Midwest	-0.291	1374799.153	4.0304	0.9685
Region South	-0.049	1295482.979	4.0223	0.9467
Region West	0.410	1286286.537	8.3177	0.9184
STATE				
Alabama (Public)	7.3107	485968.9898	3.0477	0.8805
Alaska (Public)	18.1126	121106.6175	2.5128	0.9323
Arizona (Public)	7.6102	424390.0190	2.9677	0.9111
Arkansas (Public)	-5.0211	450937.3650	1.7556	0.9457
California (Public)	2.4840	1919899.758	5.2026	0.8911
Colorado (Public)	-0.5361	637655.7752	3.0588	0.9023
Connecticut (Public)	3.9405	549786.4293	2.2570	0.9163
Delaware (Public)	64.6049	347582.8781	4.9934	0.8239
D.C. (Public)	20.0337	410700.8423	2.9786	0.7538
Florida (Public)	7.025	1184150.994	3.5757	0.8912

THE TEACHER SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Georgia (Public)	2.7559	916734.9619	2.7375	0.9176
Hawaii (Public)	7.7602	274843.8731	2.9077	0.8948
Idaho (Public)	12.1526	143005.5291	2.7167	0.9110
Illinois (Public)	7.896	1784526.120	4.1780	0.9444
Indiana (Public)	0.6314	572221.4609	2.1515	0.8705
Iowa (Public)	10.7532	904979.1854	4.8581	0.9274
Kansas (Public)	1.9362	611432.9817	2.8384	0.9523
Kentucky (Public)	7.2548	771773.5606	3.4417	0.9381
Louisiana (Public)	-3.1547	789921.8111	2.5132	0.9425
Maine (Public)	6.3764	318478.2011	3.0888	0.9340
Maryland (Public)	15.7928	726985.3969	3.0325	0.8880
Massachusetts (Public)	14.288	1043647.488	3.5505	0.9468
Michigan (Public)	3.167	1307277.480	3.2165	0.9328
Minnesota (Public)	16.6210	562808.9912	3.8649	0.9186
Mississippi (Public)	5.5644	490248.2923	3.7714	0.8932
Missouri (Public)	-1.803	1071905.560	3.1963	0.9525
Montana (Public)	36.7784	183256.4654	4.9286	0.9335
Nebraska (Public)	25.8470	219886.7641	3.6021	0.8565
Nevada (Public)	-0.7357	243824.0956	2.1019	0.9660
New Hampshire (Public)	30.9639	266780.2855	3.0917	0.8846

THE TEACHER SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
New Jersey (Public)	11.516	1142659.127	2.9946	0.9292
New Mexico (Public)	35.7783	243119.1660	3.6395	0.8526
New York (Public)	-0.476	2084572.968	3.5146	0.8740
North Carolina (Public)	-4.952	1060982.069	2.3448	0.9267
North Dakota (Public)	28.0939	104987.5753	4.8241	0.9273
Ohio (Public)	6.340	1192683.208	3.0222	0.8947
Oklahoma (Public)	12.7219	535779.9404	5.5219	0.9014
Oregon (Public)	0.2583	534158.6761	2.9702	0.9548
Pennsylvania (Public)	-2.780	1542664.450	2.3952	0.9571
Rhode Island (Public)	-4.8413	425775.9456	2.1139	0.9415
South Carolina (Public)	9.5145	521317.0949	2.8793	0.8281
South Dakota (Public)	57.0551	180444.3144	8.5746	0.8870
Tennessee (Public)	1.3925	967504.0317	3.4019	0.9452
Texas (Public)	0.133	1737081.898	3.4528	0.9601
Utah (Public)	8.6530	284008.3294	3.4124	0.8726
Vermont (Public)	51.0696	226391.5582	6.1806	0.8841
Virginia (Public)	7.6131	751359.1097	2.8297	0.8589
Washington (Public)	0.1274	715877.5320	2.7054	0.9112
West Virginia (Public)	8.1630	439644.9719	3.1728	0.9514
Wisconsin (Public)	4.593	1015207.441	3.4119	0.9673

THE TEACHER SURVEY
GVFs FOR TEACHER TOTALS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Wyoming (Public)	33.6787	145498.4856	4.1939	0.9364
SECTOR / REGION				
Public / Northeast	0.085	1741937.118	3.9704	0.9342
Public / Midwest	-0.530	1430548.472	4.0576	0.9655
Public / South	-0.169	1255196.284	3.8873	0.9413
Public / West	1.290	1225454.558	9.1142	0.9100
Private / Northeast	-1.2432	971861.6968	2.6959	0.9622
Private / Midwest	5.0475	850116.5001	3.4513	0.9634
Private / South	11.060	1153780.788	3.8505	0.9657
Private / West	13.3834	528277.1953	3.3266	0.8677
SECTOR / MINORITY				
Public / Less than 20%	2.0860	1299522.1110	6.5288	0.9090
Public / 20% or greater	1.4670	1578431.3480	7.2184	0.9240
Private / Less than 20%	3.3840	1072879.2570	3.8217	0.9784
Private / 20% or greater	7.1213	739844.7639	4.5314	0.9138

THE TEACHER SURVEY

GVFs FOR AVERAGE NUMBER OF COURSES TAKEN OR TIME SPENT

THE TEACHER SURVEY
GVFs FOR AVERAGE NUMBER OF COURSES TAKEN OR TIME SPENT

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Public	-0.073437824	7.877635775	3.4517	0.8044
Private	-0.29066253	28.99305962	2.3368	0.8569
REGION				
Northeast	-0.18420509	33.67631188	2.7311	0.7864
Midwest	-0.12653320	20.38180037	3.0091	0.8118
South	-0.04126598	12.87674569	2.6715	0.7947
West	-0.39818669	37.07206107	5.0727	0.8364
STATE				
Alabama (Public)	3.41947417	86.31946555	1.7485	0.8314
Alaska (Public)	2.36464859	91.77814455	2.2510	0.8187
Arizona (Public)	0.2578455	114.5661865	1.5836	0.8375
Arkansas (Public)	1.7817340	170.9402937	1.8011	0.8138
California (Public)	-1.4580801	123.1884294	3.4983	0.8439
Colorado (Public)	1.57188669	98.94846401	2.0269	0.7663
Connecticut (Public)	-0.9899294	144.3254592	1.4681	0.8468
Delaware (Public)	-2.8121068	483.9592517	1.9385	0.8218
D.C. (Public)	16.7316064	391.9633874	1.7946	0.8006
Florida (Public)	-0.2566342	118.4978990	2.0889	0.8065
Georgia (Public)	0.7835558	129.3895826	1.8067	0.8356

THE TEACHER SURVEY
GVFs FOR AVERAGE NUMBER OF COURSES TAKEN OR TIME SPENT

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Hawaii (Public)	0.3761103	200.0737388	1.9855	0.8609
Idaho (Public)	-1.7151286	173.3279327	1.6024	0.8465
Illinois (Public)	1.1442883	105.0195822	2.1729	0.7779
Indiana (Public)	-0.7629084	124.5054395	1.5477	0.8275
Iowa (Public)	-1.1701339	192.9911979	1.9674	0.8295
Kansas (Public)	-0.2880254	153.8371662	1.6587	0.7995
Kentucky (Public)	-0.3956985	158.4077610	1.8278	0.7884
Louisiana (Public)	-0.4547269	132.7807645	1.9465	0.8663
Maine (Public)	0.4261487	152.5681532	1.4614	0.8109
Maryland (Public)	-0.7396005	190.5265719	1.8721	0.7819
Massachusetts (Public)	-1.4326692	193.8167992	2.1051	0.8494
Michigan (Public)	-0.8393787	166.8672301	2.4568	0.8316
Minnesota (Public)	0.5028896	116.6383252	2.0503	0.7280
Mississippi (Public)	-0.2992902	217.6382172	2.6471	0.8127
Missouri (Public)	0.1944952	154.9990149	2.4129	0.8387
Montana (Public)	-0.0507992	181.5563450	2.8173	0.8023
Nebraska (Public)	-0.1722233	137.9958516	1.3768	0.8035
Nevada (Public)	-2.2754830	253.8310845	1.7895	0.8502
New Hampshire (Public)	-3.3448379	289.1940391	1.9772	0.8724
New Jersey (Public)	-1.4061495	169.9307485	1.8308	0.8270

THE TEACHER SURVEY
GVFs FOR AVERAGE NUMBER OF COURSES TAKEN OR TIME SPENT

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
New Mexico (Public)	-0.9347022	190.5835157	1.5731	0.8468
New York (Public)	0.7526494	118.5705590	2.6663	0.7492
North Carolina (Public)	0.7714071	139.8591386	1.9263	0.7954
North Dakota (Public)	-0.0148029	147.5373516	1.9025	0.8111
Ohio (Public)	-1.5951500	152.8061577	2.2062	0.8549
Oklahoma (Public)	1.32086217	94.44322941	2.6088	0.7908
Oregon (Public)	1.1082632	114.1933529	1.6834	0.7934
Pennsylvania (Public)	-1.2139142	135.9252535	2.0967	0.8127
Rhode Island (Public)	-2.6199361	344.7401704	1.6850	0.8953
South Carolina (Public)	-1.5599320	259.0629443	2.2419	0.8080
South Dakota (Public)	0.7916522	199.6904580	3.0681	0.6748
Tennessee (Public)	2.3685615	134.0536813	1.9162	0.7866
Texas (Public)	-0.49639968	78.27369797	2.3248	0.8419
Utah (Public)	-0.1328851	144.5933212	2.1407	0.8464
Vermont (Public)	11.3180306	161.8445343	2.3882	0.8364
Virginia (Public)	0.7190889	139.5137219	1.9860	0.8062
Washington (Public)	-0.2302591	158.3825777	1.7643	0.8346
West Virginia (Public)	-1.4300039	185.3552478	2.0520	0.8668
Wisconsin (Public)	-0.2636542	130.3870669	2.1965	0.8254
Wyoming (Public)	-2.1625951	202.7307498	1.4228	0.8238

THE TEACHER SURVEY
GVFs FOR AVERAGE NUMBER OF COURSES TAKEN OR TIME SPENT

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR / REGION				
Public / Northeast	-0.31030974	44.73020152	2.7906	0.7920
Public / Midwest	-0.13773445	23.03369254	2.9278	0.7945
Public / South	-0.06868240	14.50109247	2.7268	0.8080
Public / West	-0.45506403	43.89980274	5.2303	0.8334
Private / Northeast	-0.12109716	97.43521343	2.0316	0.8199
Private / Midwest	1.08927063	68.85835857	2.4097	0.7927
Private / South	-0.6926309	107.5846328	2.0325	0.8576
Private / West	0.4221194	101.4640843	2.4737	0.8576
SECTOR / MINORITY STATUS				
Public / Less than 20%	0.164661796	4.998952408	4.6752	0.9245
Public / 20% or greater	0.143549573	5.520338068	5.4439	0.9532
Private / Less than 20%	0.46680350	21.16321757	5.6237	0.9552
Private / 20% or greater	1.38791398	43.39641236	4.4537	0.9301

THE TEACHER SURVEY

GVFs FOR TEACHER PROPORTIONS

THE TEACHER SURVEY
GVFs FOR TEACHER PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
SECTOR				
Public	-.5385449013	0.5372155053	2.8493	0.9725
Private	-2.652233929	2.669488096	1.9053	0.9807
REGION				
Northeast	-2.570889825	2.557341424	2.3810	0.9662
Midwest	-1.811132332	1.809326914	2.6248	0.9911
South	-1.178214202	1.172954913	2.3030	0.9709
West	-2.480970091	2.475428806	4.4739	0.9541
STATE				
Alabama (Public)	-12.75219166	12.74210497	1.8263	0.9256
Alaska (Public)	-19.44298172	19.42574402	1.2657	0.9714
Arizona (Public)	-13.61479621	13.57529958	1.5592	0.9846
Arkansas (Public)	-15.31880038	15.50257914	1.3032	0.9671
California (Public)	-7.893604650	7.879785878	2.4598	0.9495
Colorado (Public)	-14.84538942	14.94535252	1.7187	0.9508
Connecticut (Public)	-12.95017990	13.12632301	1.1969	0.9708
Delaware (Public)	-52.59380849	53.38868993	1.1283	0.9246
D.C. (Public)	-55.50672086	55.43334328	0.9846	0.9542
Florida (Public)	-11.32585599	11.24588543	1.7254	0.9574

THE TEACHER SURVEY
GVFs FOR TEACHER PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Georgia (Public)	-13.38851056	13.51331506	1.7438	0.9529
Hawaii (Public)	-19.88902105	19.87732758	1.1357	0.9462
Idaho (Public)	-14.16227314	14.13717960	1.3720	0.9228
Illinois (Public)	-11.89714744	11.84194383	2.2999	0.9716
Indiana (Public)	-9.727039667	9.791886761	1.5178	0.9181
Iowa (Public)	-21.20936659	21.30734858	2.1445	0.9533
Kansas (Public)	-16.59860144	16.59541291	1.5411	0.9780
Kentucky (Public)	-19.14653636	19.09509157	1.9487	0.9750
Louisiana (Public)	-14.76289725	14.75053629	1.6405	0.9740
Maine (Public)	-20.72203460	20.91082808	1.3592	0.9423
Maryland (Public)	-18.43827223	18.33571481	1.6118	0.9486
Massachusetts (Public)	-14.31803087	14.50927682	2.0446	0.9628
Michigan (Public)	-14.28802016	14.27385971	1.6288	0.9810
Minnesota (Public)	-11.97275270	11.93962628	1.8020	0.9601
Mississippi (Public)	-14.10319516	14.70784535	1.4765	0.8989
Missouri (Public)	-15.69315399	15.91291289	2.1393	0.9602
Montana (Public)	-20.12843824	20.20895195	2.2190	0.9424
Nebraska (Public)	-11.90958332	11.90682467	1.5922	0.9359
Nevada (Public)	-21.40593211	21.40755604	1.2476	0.9801
New Hampshire (Public)	-25.28638361	25.24078351	1.1774	0.9508

THE TEACHER SURVEY
GVFs FOR TEACHER PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
New Jersey (Public)	-12.51696984	12.44418538	1.5315	0.9741
New Mexico (Public)	-16.24320361	16.74501569	1.4599	0.9332
New York (Public)	-10.64695586	10.56959657	2.0491	0.9495
North Carolina (Public)	-15.52952212	15.42298110	1.7386	0.9601
North Dakota (Public)	-13.87674315	13.86590368	1.6409	0.9653
Ohio (Public)	-10.96106052	10.97409749	1.6973	0.9291
Oklahoma (Public)	-13.74457299	13.74080113	2.3292	0.9564
Oregon (Public)	-16.83773435	16.95435100	1.7246	0.9602
Pennsylvania (Public)	-11.03612463	10.97233886	1.3684	0.9793
Rhode Island (Public)	-36.28023535	36.15299813	1.4385	0.9612
South Carolina (Public)	-15.72452339	15.70805079	1.6756	0.9011
South Dakota (Public)	-19.57393933	19.84948946	1.8826	0.9332
Tennessee (Public)	-17.20660656	17.24588392	1.7288	0.9546
Texas (Public)	-7.267683335	7.242688176	1.8895	0.9790
Utah (Public)	-14.12165872	14.11568191	1.3722	0.9570
Vermont (Public)	-33.51868719	33.41312570	1.0946	0.9344
Virginia (Public)	-13.40966967	13.40551623	1.6555	0.9326
Washington (Public)	-13.31595188	13.34028231	1.6668	0.9416
West Virginia (Public)	-17.87586216	17.90090295	1.5631	0.9646
Wisconsin (Public)	-14.42067712	14.40164908	1.7568	0.9783

THE TEACHER SURVEY
GVFs FOR TEACHER PROPORTIONS

Best GVF is Model 1: $CV(\%) = \sqrt{A + B/X}$

	Parameter			
Subpopulation	A	B	Design Effect	R-Squared
Wyoming (Public)	-18.73998406	18.70334729	1.6890	0.9554
SECTOR / REGION				
Public / Northeast	-3.397768157	3.387123256	2.5645	0.9699
Public / Midwest	-2.199925156	2.194314624	2.6887	0.9913
Public / South	-1.333060060	1.327367550	2.3801	0.9723
Public / West	-2.873586040	2.871158493	5.1345	0.9553
Private / Northeast	-9.127579642	9.314097131	1.6961	0.9745
Private / Midwest	-9.745620688	9.705726773	2.1055	0.9816
Private / South	-9.612222155	9.644182117	1.6537	0.9766
Private / West	-10.22289020	10.52530735	1.7067	0.9182
SECTOR / MINORITY STATUS				
Public / Less than 20%	-1.090134507	1.087477729	2.5893	0.9755
Public / 20% or greater	-1.230691925	1.226015508	3.3938	0.9728
Private / Less than 20%	-5.202341689	5.182989971	1.7785	0.9923
Private / 20% or greater	-4.872918671	5.091759653	1.9559	0.9613

APPENDIX IV

SUM OF WEIGHTS TABLE

SUM OF WEIGHTS TABLE

SUM OF WEIGHTS

	Sum of Weights		
Group	Teachers	Principals	Schools
SECTOR			
Public	2559488	78890	79885
Private	356286	23881	24690
REGION			
Northeast (Public & Private)	630456	18977	19321
Midwest (Public & Private)	746697	30587	31351
South (Public & Privae)	1026961	31953	32313
West (Public & Private)	511671	21254	21590
STATE / SCHOOL LEVEL			
Alabama / Elementary (Public)	20239	759	787
Alabama / Secondary (Public)	17477	251	256
Alaska / Elementary (Public)	3011	146	157
Alaska / Secondary (Public)	2990	73	76
Arizona / Elementary (Public)	22322	708	735
Arizona / Secondary (Public)	8385	229	239
Arkansas / Elementary (Public)	12148	648	648
Arkansas / Secondary (Public)	12106	409	413
California / Elementary (Public)	139435	5024	5169
California / Secondary (Public)	56195	1603	1720
Colorado / Elementary (Public)	15506	905	927
Colorado / Secondary (Public)	15662	263	280
Connecticut / Elementary (Public)	12374	662	695

SUM OF WEIGHTS

Group	Sum of Weights		
	Teachers	Principals	Schools
Connecticut / Secondary (Public)	16900	201	227
Delaware / Elementary (Public)	2907	95	106
Delaware / Secondary (Public)	3044	44	44
D.C. / Elementary (Public)	2665	103	113
D.C. / Secondary (Public)	2565	44	53
Florida / Elementary (Public)	41736	1539	1610
Florida / Secondary (Public)	37470	425	455
Georgia / Elementary (Public)	33847	1260	1272
Georgia / Secondary (Public)	21407	349	347
Hawaii / Elementary (Public)	4230	173	173
Hawaii / Secondary (Public)	3280	47	47
Idaho / Elementary (Public)	5337	331	347
Idaho / Secondary (Public)	4814	147	156
Illinois / Elementary (Public)	58844	2699	2734
Illinois / Secondary (Public)	30098	950	963
Indiana / Elementary (Public)	25804	1348	1360
Indiana / Secondary (Public)	23699	431	441
Iowa / Elementary / (Public)	15917	987	1031
Iowa / Secondary (Public)	14017	459	465
Kansas / Elementary (Public)	13911	1004	1006
Kansas / Secondary (Public)	10598	385	391
Kentucky / Elementary (Public)	23350	885	946

SUM OF WEIGHTS

	Sum of Weights		
Group	Teachers	Principals	Schools
Kentucky / Secondary (Public)	11889	294	304
Louisiana / Elementary (Public)	23615	859	896
Louisiana / Secondary (Public)	12512	272	287
Maine / Elementary (Public)	9186	540	567
Maine / Secondary (Public)	5018	153	153
Maryland / Elementary (Public)	19891	837	875
Maryland / Secondary (Public)	20202	235	242
Massachusetts / Elementary (Public)	19673	1267	1372
Massachusetts / Secondary (Public)	32574	332	359
Michigan / Elementary (Public)	30531	2133	2283
Michigan / Secondary (Public)	40294	666	705
Minnesota / Elementary (Public)	21803	810	842
Minnesota / Secondary (Public)	20329	434	448
Mississippi / Elementary (Public)	15064	510	518
Mississippi / Secondary (Public)	11866	301	312
Missouri / Elementary (Public)	25242	1315	1344
Missouri / Secondary (Public)	23512	589	607
Montana / Elementary (Public)	6564	445	507
Montana / Secondary (Public)	3095	195	211
Nebraska / Elementary (Public)	9605	732	1082
Nebraska / Secondary (Public)	8108	332	339
Nevada / Elementary (Public)	4579	209	219

SUM OF WEIGHTS

	Sum of Weights		
Group	Teachers	Principals	Schools
Nevada / Secondary (Public)	3769	78	82
New Hampshire / Elementary (Public)	6257	305	313
New Hampshire / Secondary (Public)	4106	83	86
New Jersey / Elementary (Public)	39130	1667	1740
New Jersey / Secondary (Public)	29433	358	424
New Mexico / Elementary (Public)	8502	443	451
New Mexico / Secondary (Public)	4386	129	139
New York / Elementary (Public)	78455	2594	2681
New York / Secondary (Public)	67372	914	943
North Carolina / Elementary (Public)	30483	1358	1418
North Carolina / Secondary (Public)	21067	427	431
North Dakota / Elementary (Public)	4958	360	381
North Dakota / Secondary (Public)	2674	219	226
Ohio / Elementary (Public)	54687	2534	2571
Ohio / Secondary (Public)	45021	960	1025
Oklahoma / Elementary (Public)	15950	1088	1116
Oklahoma / Secondary (Public)	14991	551	575
Oregon / Elementary (Public)	13929	833	859
Oregon / Secondary (Public)	10193	266	277
Pennsylvania / Elementary (Public)	44837	2234	2270
Pennsylvania / Secondary (Public)	47305	785	789
Rhode Island / Elementary (Public)	3974	226	230

SUM OF WEIGHTS

Group	Sum of Weights		
	Teachers	Principals	Schools
Rhode Island / Secondary (Public)	3761	60	62
South Carolina / Elementary (Public)	23138	729	749
South Carolina / Secondary (Public)	12563	290	296
South Dakota / Elementary (Public)	4780	455	461
South Dakota / Secondary (Public)	3339	257	266
Tennessee / Elementary (Public)	26462	1033	1048
Tennessee / Secondary (Public)	15620	342	360
Texas / Elementary (Public)	96826	3923	4000
Texas / Secondary (Public)	86211	1198	1199
Utah / Elementary (Public)	9251	458	462
Utah / Secondary (Public)	5916	189	223
Vermont / Elementary (Public)	2876	249	272
Vermont / Secondary (Public)	2964	49	47
Virginia / Elementary (Public)	33919	1255	1288
Virginia / Secondary (Public)	25525	358	383
Washington / Elementary (Public)	18677	1156	1227
Washington / Secondary (Public)	16005	464	480
West Virginia / Elementary (Public)	10956	693	701
West Virginia / Secondary (Public)	7985	266	274
Wisconsin / Elementary (Public)	28344	1274	1311
Wisconsin / Secondary (Public)	16854	490	510
Wyoming / Elementary (Public)	2427	249	249

SUM OF WEIGHTS

	Sum of Weights		
Group	Teachers	Principals	Schools
Wyoming / Secondary (Public)	3491	85	86
SECTOR / REGION			
Public / Northeast	532953	13705	13805
Public / Midwest	654001	23124	23690
Public / South	916898	25838	25993
Public / West	455635	16223	16397
Private / Northeast	97492	5272	5516
Private / Midwest	92695	7462	7661
Private / South	110063	6115	6321
Private / West	56036	5031	5192
SECTOR / COMMUNITY TYPE[1] / MINORITY STATUS			
Public / Urban / Less than 20%	157264	4506	4616
Public / Urban / 20% or greater	508301	13279	14068
Public/ Suburban / Less than 20%	416161	11049	11562
Public / Suburban / 20% or greater	330885	8991	9287
Public / Rural / Less than 20%	742335	28723	29854
Public/ Rural / 20% or greater	300105	10230	10498
Private/ Urban / Less than 20%	93291	4734	5325
Private/ Urban / 20% or greater	52070	3569	4086
Private/ Suburban / Less than 20%	76080	4900	5415

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[1] Community types Urban, Suburban and Rural correspond to Central City, Urban Fringe/Large Town and Rural/Small Town, respectively (see table 2.3).

SUM OF WEIGHTS

	Sum of Weights		
Group	Teachers	Principals	Schools
Private/ Suburban / 20% or greater	30095	2036	2279
Private / Rural / Less than 20%	58070	5351	6198
Private/ Rural / 20% or greater	8532	1171	1387
SECTOR / SCHOOL LEVEL			
Public / Elementary		54047	56121
Public / Secondary		18930	19723
Public / Combined		3802	4041
Private / Elementary		13675	15445
Private / Secondary		2220	2446
Private / Combined		5868	6800
SECTOR / COMMUNITY TYPE[1]			
Public / Urban			18684
Public / Suburban			20849
Public / Rural			40352
Private / Urban			9411
Private / Suburban			7694
Private / Rural			7585

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[1] Community types Urban, Suburban and Rural correspond to Central City, Urban Fringe/Large Town and Rural/Small Town, respectively (see table 2.3).

SUM OF WEIGHTS

	Sum of Weights		
Group	Teachers	Principals	Schools
TYPOLOGY			
Catholic (Parochial)		5039	5437
Catholic (Diocesan)		2238	2400
Catholic (Private)		820	894
Other Religious (Cnsrvt Chrstn)[2]		3534	4045
Other Religious (Affiliated)		3868	4262
Other Religious (Unaffiliated)		2460	3169
Non-Sectarian (Regular)		1681	1950
Non-Sectarian (Special Emphasis)		1370	1700
Non-Sectarian (Special Education)		751	833
SECTOR / COMMUNITY TYPE[1] / SCHOOL SIZE			
Public / Urban / 1-149	10191		987
Public / Urban / 150-499	167253		7382
Public / Urban / 500-749	180020		5324
Public / Urban / 750+	308101		4991
Public / Suburban / 1-149	7950		1014
Public / Suburban / 150-499	219309		9107
Public / Suburban / 500-749	199779		5850
Public / Suburban / 750+	320008		4878
Public / Rural / 1-149	73466		7843

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[1] Community types Urban, Suburban, and Rural correspond to Central City, Urban Fringe/Large Twn and Rural/Small Town, respectively (see table 2.3).

[2] Conservative Christian

SUM OF WEIGHTS

	Sum of Weights		
Group	Teachers	Principals	Schools
Public / Rural / 150-499	474525		21477
Public / Rural / 500-749	271851		7252
Public / Rural / 750+	222599		3780
Private / Urban / 1-149	24473		3851
Private / Urban / 150-499	75096		4515
Private / Urban / 500-749	23900		700
Private / Urban / 750+	21891		345
Private / Suburban / 1-149	25081		3681
Private / Suburban / 150-499	61326		3523
Private / Suburban / 500-749	9992		305
Private / Suburban / 750+	9777		185
Private / Rural / 1-149	26589		5540
Private / Rural / 150-499	35020		1912
Private / Rural / 500-749	4121		**
Private / Rural / 750+	**		**
STATE			
Alabama (Public)	37716	1225	1243
Alaska (Public)	6113	414	425
Arizona (Public)	30707	990	992
Arkansas (Public)	25572	1074	1074
California (Public)	195864	7165	7193

**Two few cases for a reliable estimate

SUM OF WEIGHTS

Group	Sum of Weights		
	Teachers	Principals	Schools
Colorado (Public)	31168	1290	1304
Connecticut (Public)	35050	919	933
Delaware (Public)	5951	159	161
D.C. (Public)	6232	167	170
Florida (Public)	95857	2245	2269
Georgia (Public)	62280	1650	1650
Hawaii (Public)	7684	231	231
Idaho (Public)	10258	526	545
Illinois (Public)	105217	3935	3949
Indiana (Public)	53749	1842	1856
Iowa (Public)	30873	1520	1530
Kansas (Public)	27317	1442	1442
Kentucky (Public)	35239	1274	1323
Louisiana (Public)	42920	1445	1449
Maine (Public)	14204	731	738
Maryland (Public)	40093	1129	1128
Massachusetts (Public)	59517	1733	1775
Michigan (Public)	79972	3004	3110
Minnesota (Public)	42132	1402	1434
Mississippi (Public)	26930	905	913
Missouri (Public)	49632	2059	2063
Montana (Public)	9659	677	739

SUM OF WEIGHTS

	Sum of Weights		
Group	Teachers	Principals	Schools
Nebraska (Public)	17713	1113	1455
Nevada (Public)	8348	313	313
New Hampshire (Public)	10363	417	417
New Jersey (Public)	78335	2208	2224
New Mexico (Public)	15175	626	626
New York (Public)	170236	3889	3889
North Carolina (Public)	59771	1917	1917
North Dakota (Public)	7632	612	647
Ohio (Public)	99708	3623	3623
Oklahoma (Public)	34515	1730	1730
Oregon (Public)	24911	1160	1164
Pennsylvania (Public)	103307	3200	3205
Rhode Island (Public)	8934	294	294
South Carolina (Public)	35701	1070	1085
South Dakota (Public)	8172	728	732
Tennessee (Public)	42082	1461	1485
Texas (Public)	187159	5647	5651
Utah (Public)	17124	690	718
Vermont (Public)	6656	313	331
Virginia (Public)	59928	1734	1737
Washington (Public)	38344	1765	1772
West Virginia (Public)	22702	1007	1007

SUM OF WEIGHTS

Group	Sum of Weights		
	Teachers	Principals	Schools
Wisconsin (Public)	47721	1844	1848
Wyoming (Public)	6798	376	376

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